BALLUFF

sensors worldwide

product**news**

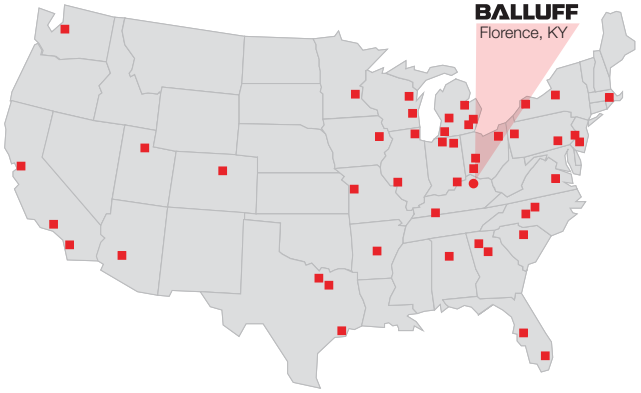
Top quality for efficient automation.

Balluff North America

Florence, Kentucky USA
Balluff's Florence, Kentucky United States headquarters is located just south of Cincinnati, Ohio. Our customers are in industries such as automotive, machine tool, robotics, injection molding, packaging, material handling, and more.

In addition to sales, marketing, and logistic functions, this facility manufactures Micropulse® magnetostrictive linear position sensors and warehouses over 60,000 products.

Local Premier Distributor Support



Our premier distributor network can quickly assist with applications and order fulfillment.

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Service

- 24 hour on-call service.
- Complete in-house technical support.
- Comprehensive product selection, cross reference, and application assistance.
- Fast, friendly experienced service – guaranteed!
- Same day shipping – in by 2:00 p.m. EST, out the same day!

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Superior quality for efficient automation

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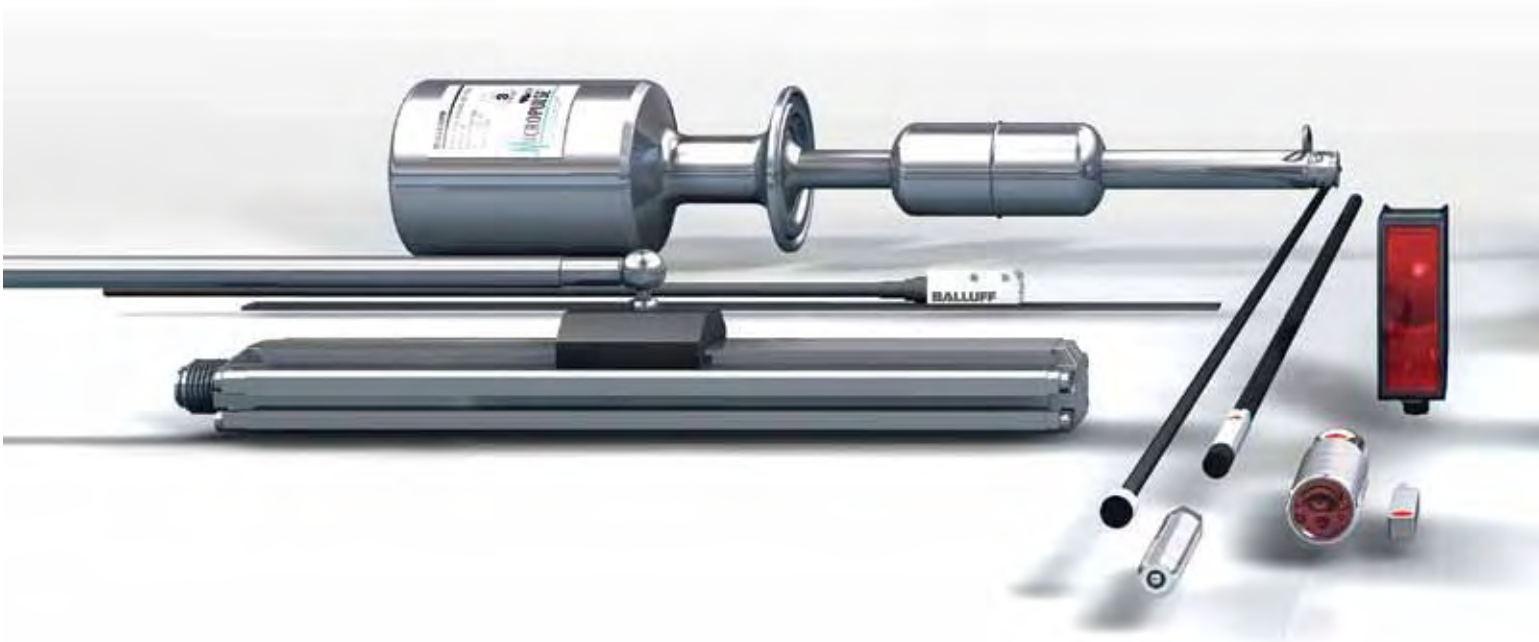
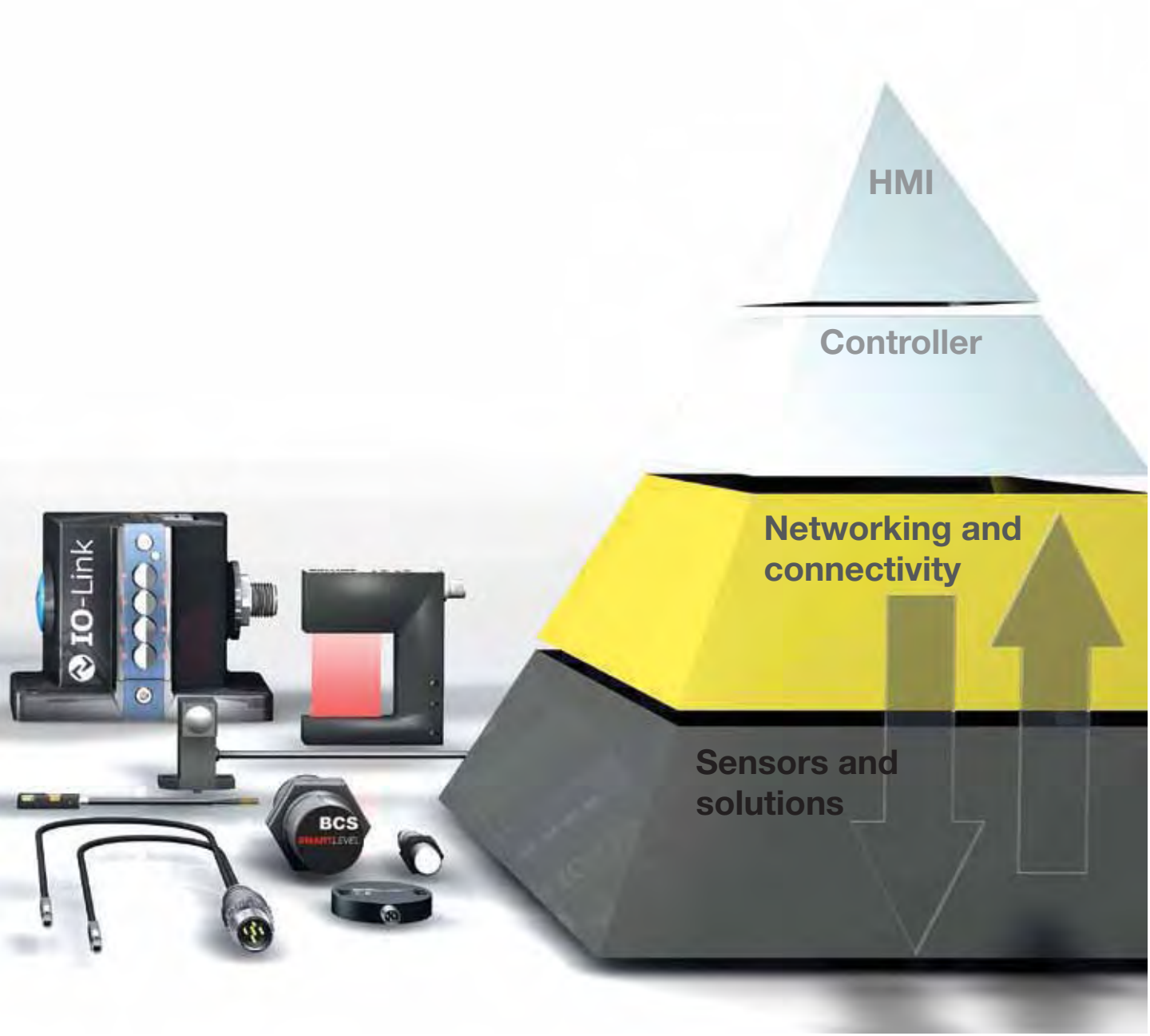
Object Detection, Linear Position and Measurement, Fluid Detection, and Accessories

Inductive Sensors, Capacitive Sensors, Magnetic Field Sensors, Photoelectric Sensors, Mechanical Switches, Ultrasonic Sensors, Inductive and Photoelectric Distance Sensors, Magnetoinductive Linear Position Sensors, Micropulse Linear Position Transducers, Magnetic Encoder Systems, Pressure Sensors, Connectors, Brackets, and Mounting Systems.



Sensors and Solutions

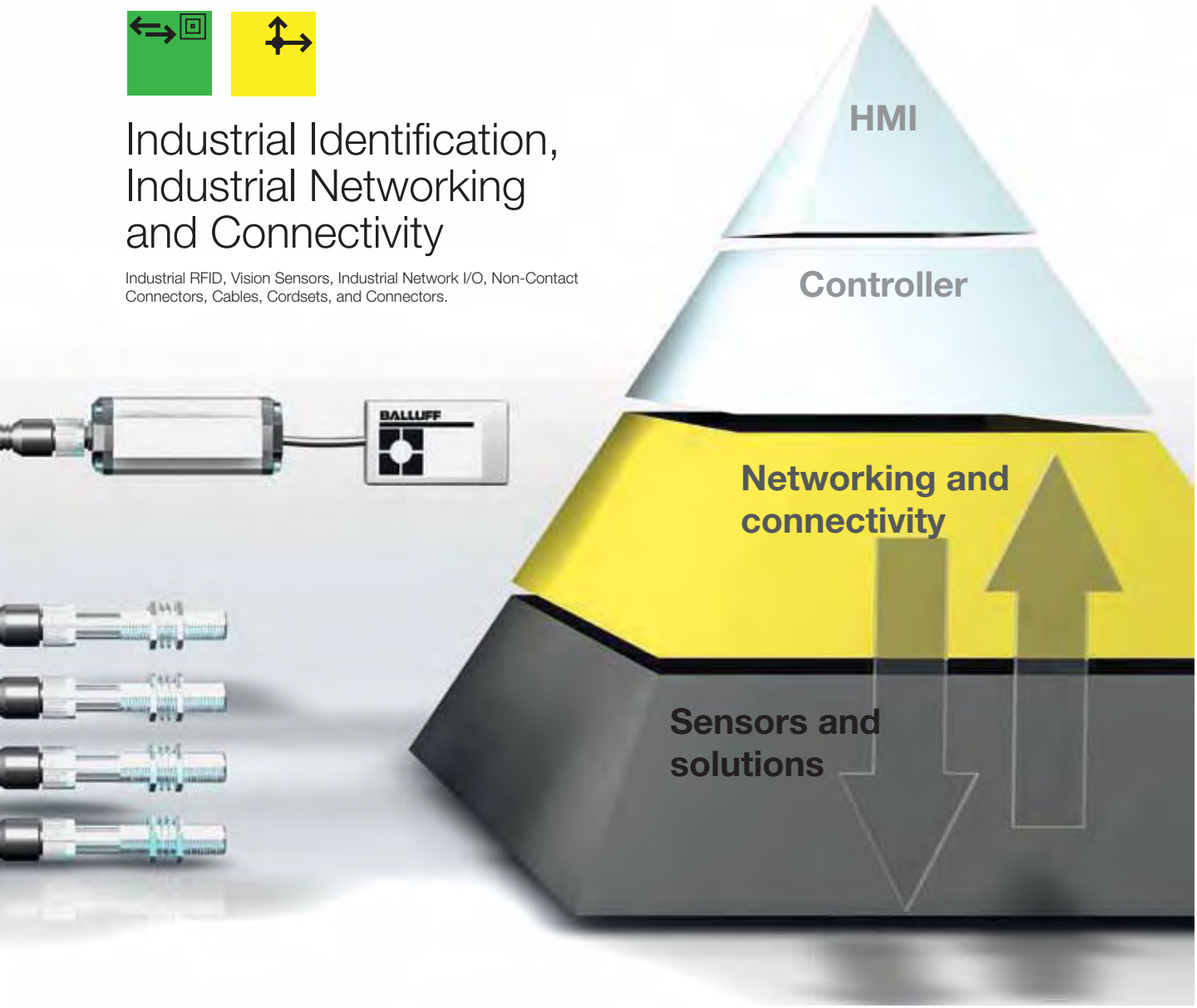
Balluff has the right products for your application



IO-Link

Industrial Identification, Industrial Networking and Connectivity

Industrial RFID, Vision Sensors, Industrial Network I/O, Non-Contact Connectors, Cables, Cordsets, and Connectors.

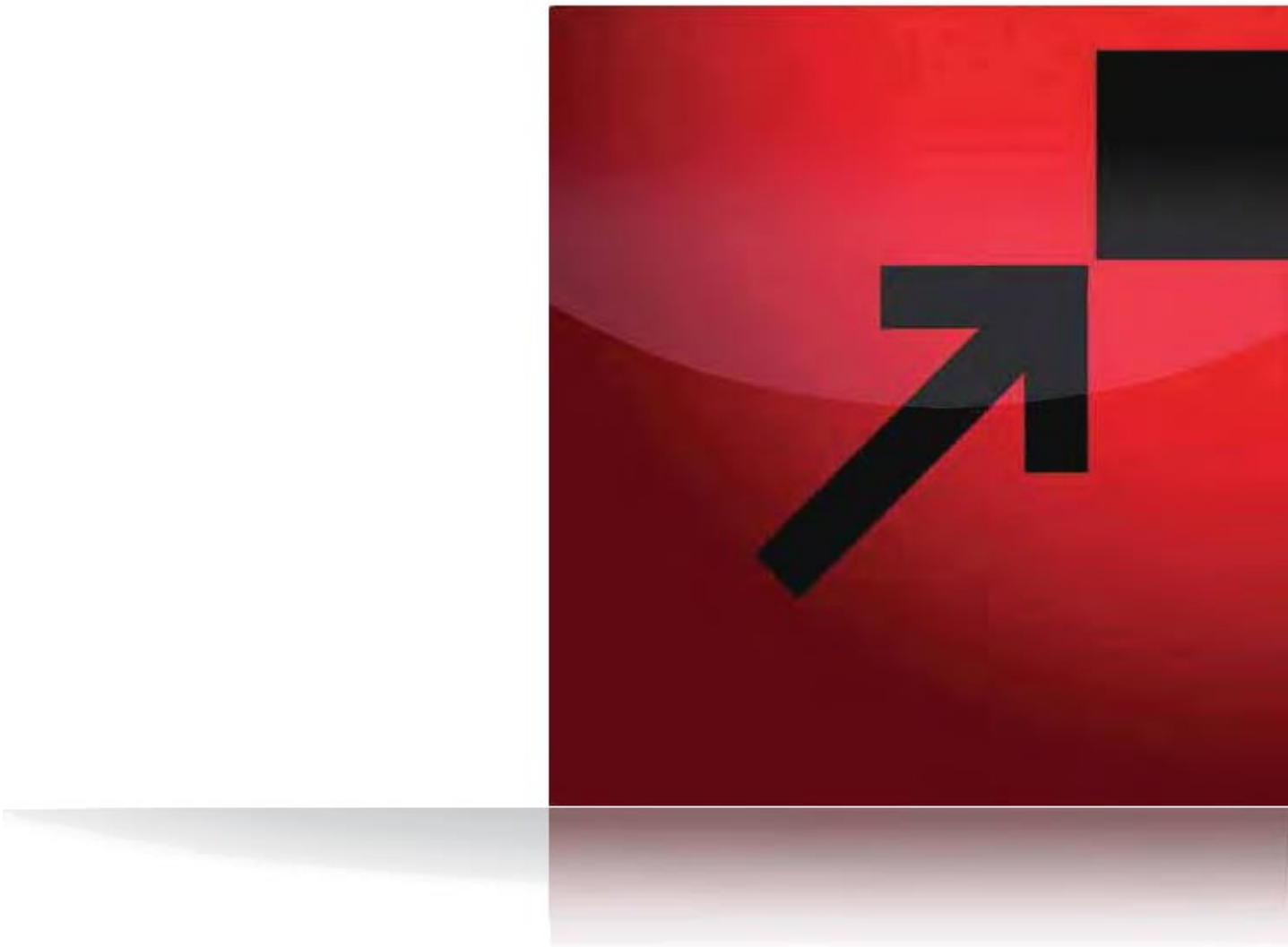


Industry Solutions
We are a key player in your industry

Automotive, Factory Automation, Metal Working, Energy, Hydraulics and Pneumatics, Healthcare, Packaging, Handling, Wood...

object detection

mechanical multiple position switches
inductive sensors
photoelectric sensors
sensors for pneumatic cylinders
capacitive sensors
ultrasonic sensors

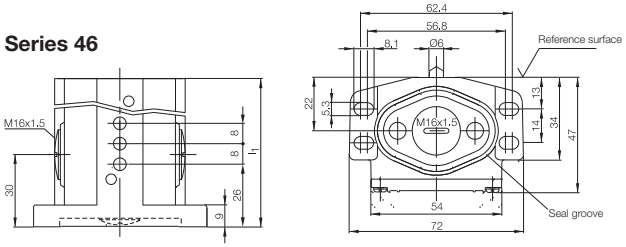


Stays cool, even if things are getting too hot

The ultra-high temperature-proof single and multiple position switches can be used for temperatures up to 180 °C, require little space and feature a robust die casting housing. They are the perfect solution for harsh environments in die construction, plastic and steel industry.

Switch element BSE 79

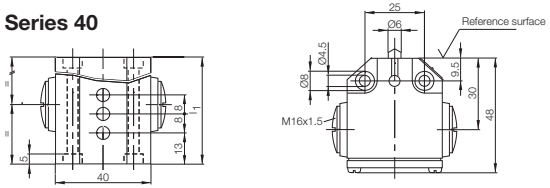
Series 46



Available sizes

Number of plungers	2	3
Dimension l_1	49 mm	59 mm

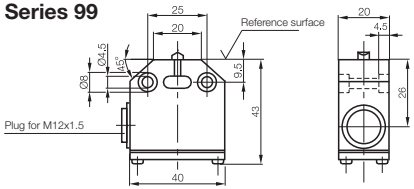
Series 40



Available sizes

Number of plungers	2	3
Dimension l_1	49 mm	59 mm

Series 99



For extreme Applications up to +180 °C

Ultra-high temperature-resistant single and multiple position switches BNS

Ordering example:
BNS 819-B03-D08-46-15

BNS 819-B_ _-_ 08-_ _-15

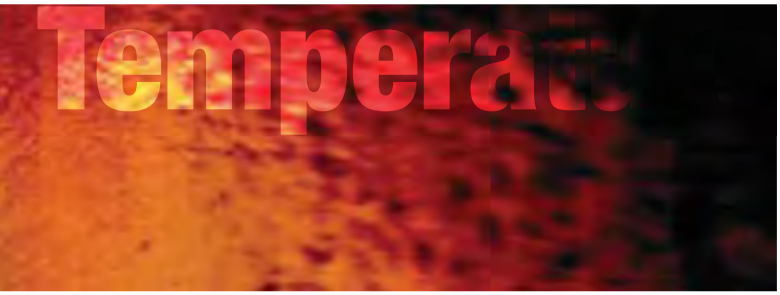
No. of plungers		Plunger style		Model
02	2×	**D**	Chisel	**40**
03	3×	**K**	Ball	**46**
		R	Roller	

Ordering example:
BNS 819-99-D-15

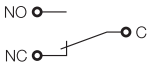
BNS 819-99-_ 15

Plunger style

D	Chisel
K	Ball
R	Roller

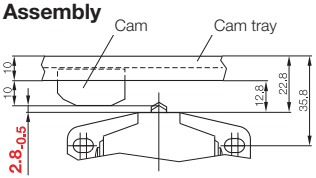


Type	Single and multiple position switches, 40, 46 and 99 series
Plunger spacing	8/10 mm
Plunger style	Chisel (**D**), Ball (**K**), Roller (**R**)
Plunger material	Stainless steel, contact surfaces induction-hardened
Housing material	Cast aluminum, corrosion-resistant, anodized finish
Connection type	M12×1.5 or M16×1.5
Ambient temperature range	–5...+150 °C (–5...+180 °C 10 h/day) +23...302 °F (+23...356 °F 10 h/day)
Degree of protection per IEC 60529	IP 67



Switching element	**BSE 79**
Part number	BNS 819-...-46-12
Contact material	Gold
Switching principle	Snap switch
Contact system	Single-pin changeover
Connection type	Solder connection
Approval	UL, CE, CSA, CCC, ENEC
Plunger point to reference surface	4 mm
Switching point to reference surface	3.5 mm
Maximum plunger travel	3.5 mm
Switching actuating force on plunger	Min. 8 N

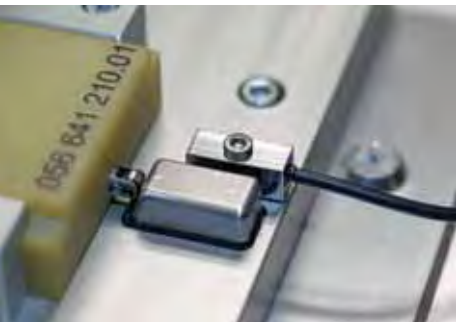
Assembly



Attention!
To ensure switching function, the dimension $2.8_{-0.5}$ is especially critical.

- Thanks to miniature frame size, position sensing is now possible where there was never space for a sensor before
- Assemblies can be smaller, since the sensors require less space
- Ideal price/performance ratio
- Robust through high-quality metal enclosure
- High functional reserve through increased switching distance

Common application examples
- Linear units
- Robotics and automation
- Vibrating conveyor



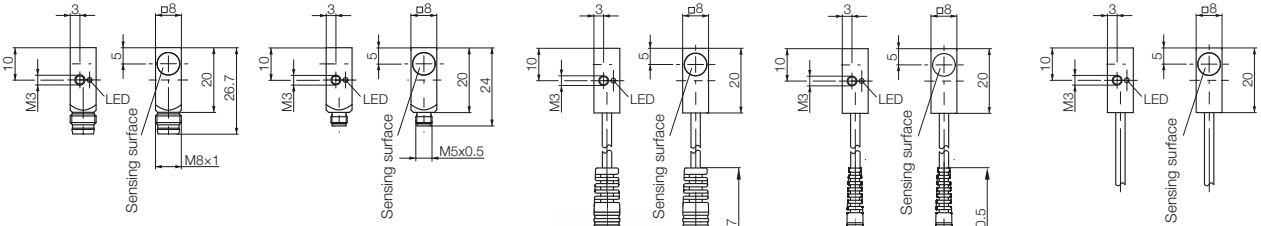
Size		
Mounting type		
Rated switching distance s_n		
Switching distance identification		
PNP	**Ordering code**	
NO	Part number	
Operating voltage U_B		
Rated operating current I_e		
Reverse polarity/short-circuit protected		
Function indicator		
Ambient temperature range		
Switching frequency f		
Degree of protection per IEC 60529		
Approvals		
Housing material		
Material of sensing face		
Connection		

For installation instructions and connection circuit diagrams, see the catalog "Object detection – Inductive sensors".

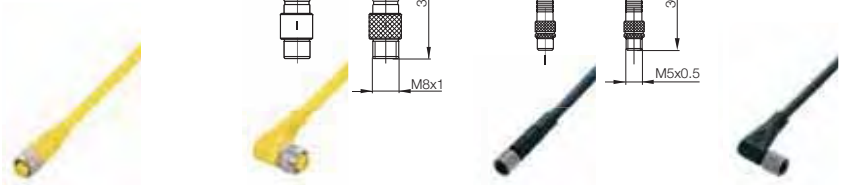
Inductive Sensors BES 8×8 mm Shorties

The sensors with the miniature dimensions

	8×27×8 mm	**8×24×8 mm**	**8×20×8 mm**	**8×20×8 mm**	**8×20×8 mm**
	Flush	Flush	Flush	Flush	Flush
	2 mm	2 mm	2 mm	2 mm	2 mm
	■■	■■	■■	■■	■■
	BES03Y8	**BES03U4**	**BES041N**	**BES041U**	**BES03U2**
	BES Q08MEC-PSC20B-S49G	BES Q08MEC-PSC20B-S26G	BES Q08MEC-PSC20B-EP00,3-GS49	BES Q08MEC-PSC20B-EP00,3-GS26	BES Q08MEC-PSC20B-EP02
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	200 mA	200 mA	200 mA	200 mA	200 mA
	Yes/yes	Yes/yes	Yes/yes	Yes/yes	Yes/yes
	Yes	Yes	Yes	Yes	Yes
	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
	3000 Hz	3000 Hz	3000 Hz	3000 Hz	3000 Hz
	IP 67	IP 67	IP 67	IP 67	IP 67
	CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus
	Brass-coated	Brass-coated	Brass-coated	Brass-coated	Brass-coated
	PBT	PBT	PBT	PBT	PBT
	M8 connector, 3-pin	M5 connector, 3-pin	0.3 m cable PUR with M8 connector, 3-pin	0.3 m cable PUR with M5 connector, 3-pin	2 m cable PUR, 3×0.14 mm²



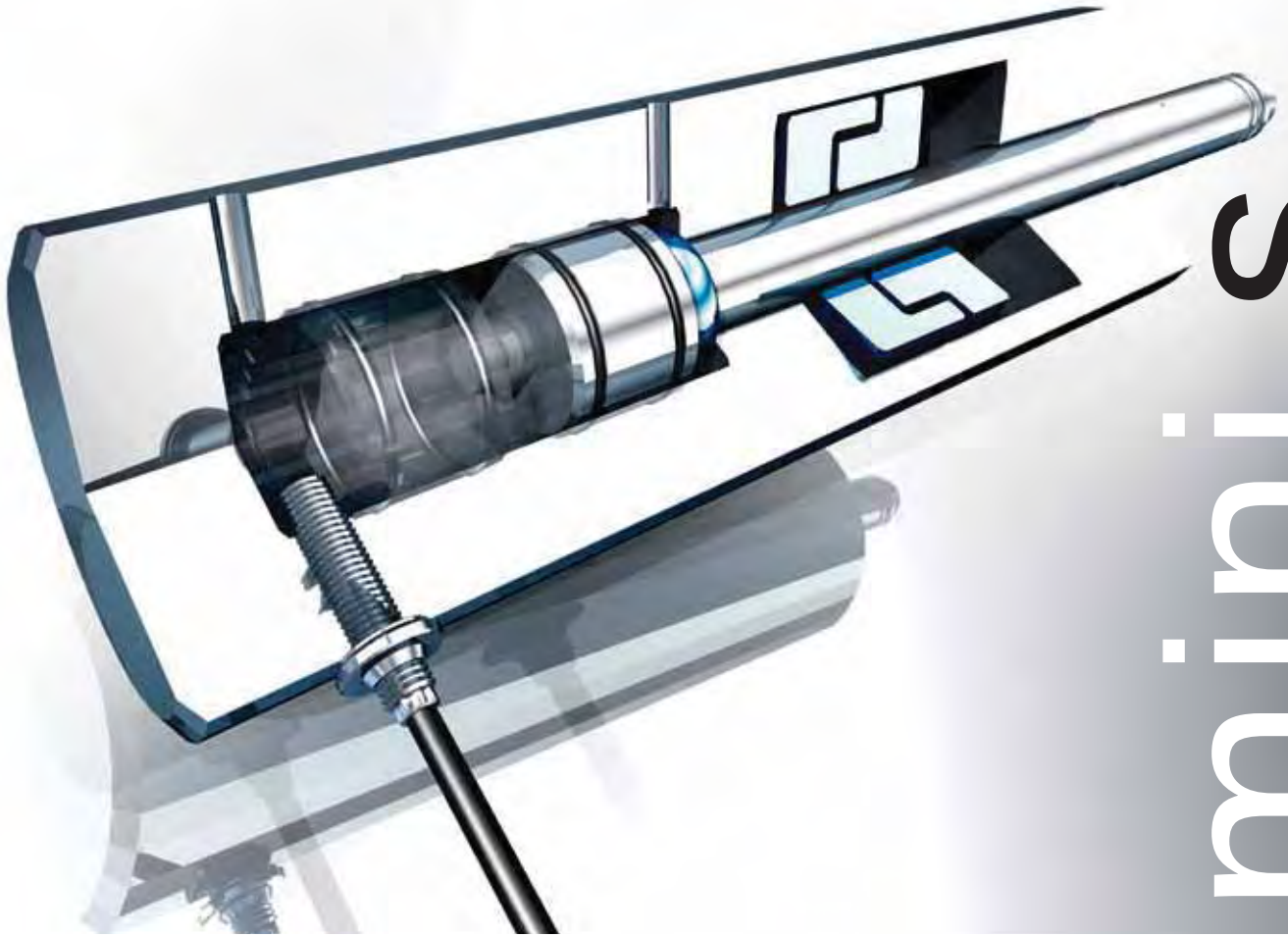
A large selection of plug connectors and connecting cables in different cable materials and lengths can be found in our catalog Industrial Networking and Connectivity.



Connector		**M8 × 1**	**M8 × 1**	**M5×0.5**	**M5×0.5**
Type		Straight female	Right angle female	Straight female	Right angle female
Cable length/material		2 m PUR	2 m PUR	3 m PUR	3 m PUR
No LED	**Ordering code**	**BCC050P**	**BCC05SU**	**BCC00HE**	**BCC00HM**
	Part number	BCC M313-0000-10-001-PX43T2-020	BCC M323-0000-10-006-PX43T2-020	BKS-B 25-1-PU-03	BKS-B 25-1-PU-03

mini.S up to 100 bar

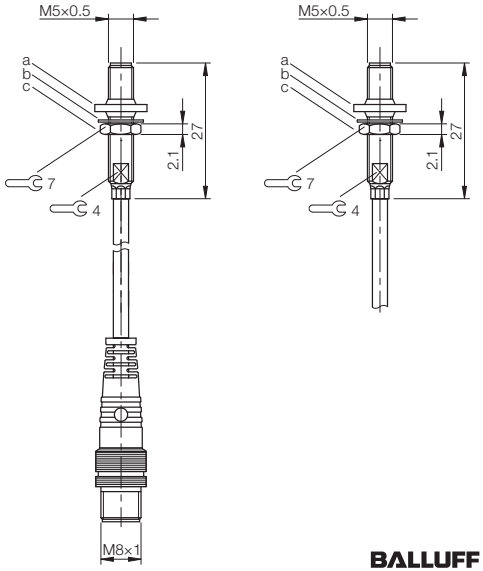
- Mini design M5
- For pressure-resistant applications up to 100 bar
- Ideal price/performance ratio



Pressure-resistant Inductive Mini Sensors
Powerful M5 sensors up to 100 bar

Size			**M5×0.5**	**M5×0.5**
Mounting type			Flush	Flush
Rated switching distance s_n			**0.8 mm**	**0.8 mm**
PNP	NO	**Ordering code**	**BES03LC**	**BES03L7**
		Part number	BES M05ED-PSD08B-BP00.3-GS49-R03	BES M05ED-PSD08B-BP02-R03
	NC	**Ordering code**	**BES03LE**	**BES03L8**
		Part number	BES M05ED-POD08B-BP00.3-GS49-R03	BES M05ED-POD08B-BP02-R03
NPN	NO	**Ordering code**	**BES03LF**	**BES03L9**
		Part number	BES M05ED-NSD08B-BP00.3-GS49-R03	BES M05ED-NSD08B-BP02-R03
	NC	**Ordering code**	**BES03LH**	**BES03LA**
		Part number	BES M05ED-NOD08B-BP00.3-GS49-R03	BES M05ED-NOD08B-BP02-R03
Operating voltage U_B			10...30 V DC	10...30 V DC
Rated operating current I_e			100 mA	100 mA
Reverse polarity protected			Yes	Yes
Short-circuit protected			Yes	Yes
Ambient temperature range			–25...+70 °C	–25...+70 °C
Sensor degree of protection acc. to IEC 60529			IP 67	IP 67
Approvals			CE, cULus	CE, cULus
Housing material			Stainless steel	Stainless steel
Material of sensing face			Ceramic	Ceramic
Connection			0.3 m cable PUR with M8 connector, 3-pin	2 m cable PUR, 3×0.14 mm²
Pressure rated to			**100 bar**	**100 bar**

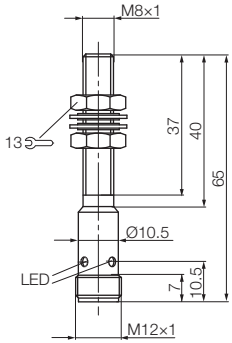
a) Sealing washer
b) Plain washer
c) Mounting nut
Included in the scope of delivery!



Application areas
- Coolant/lubricant sector
- Laboratories
- Low-pressure hydraulic systems
- Valves
- Pneumatic systems
- Industrial cleaning
- Special machine construction

- Greater switching distances for increased performance
- Saves time during installation because adjustments are minimized
- Greater reliability, even if the detected objects vibrate
- Housing and sensor identification optimized to meet requirements in the automobile industry
- Ideal for applications with variable detection objects (steel, AL, CuZn and Cu)

Size			**M8 × 1**
Mounting type			Flush
Rated switching distance s_n			**2 mm**
PNP	NO	**Ordering code**	**BES03YP**
		Part number	BES M08MG1-PSC20A-S04G-W
Operating voltage U_B			10...30 V DC
Rated operating current I_e			100 mA
Reverse polarity/short-circuit protected			Yes/yes
Ambient temperature range			–25...+70 °C
Switching frequency f			1000 Hz
Degree of protection per IEC 60529			IP 67
Approvals			CE, cULus
Housing material			Brass, PTFE coated
Material of sensing face			LCP
Connection			M12 connector, 3-pin, A-coded

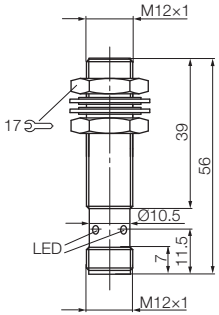


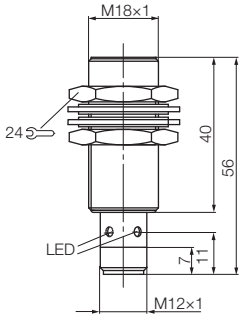
Application areas

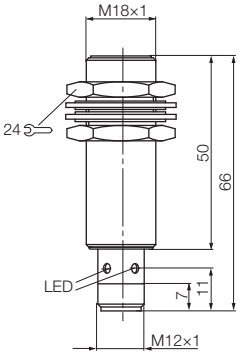
- Welding lines
- Lightweight construction
- Automobile suppliers
- Material handling technology
- Electric motors and electrical brakes
- Special machine construction

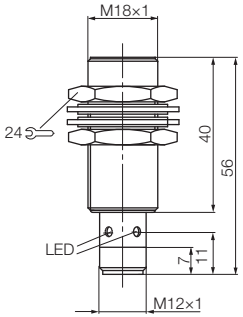
Weld Immune Factor 1+ Sensors
A plus for your application

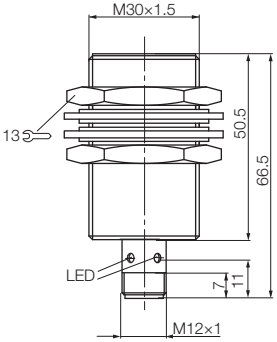
M12×1	**M18×1**	**M18×1**	**M18×1**	**M30×1.5**
Flush	Flush	Flush	Quasi-flush	Flush
4 mm	**8 mm**	**8 mm**	**12 mm**	**15 mm**
BES0452	**BES03YT**	**BES0453**	**BES03YW**	**BES0454**
BES M12MG-PSC40A-S04G-W12	BES M18MG-PSC80A-S04G-W	BES M18MI-PSC80A-S04G-W12	BES M18MG-PSC12A-S04G-W	BES M30MI-PSC15A-S04G-W12
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
200 mA	200 mA	200 mA	200 mA	200 mA
Yes/yes	Yes/yes	Yes/yes	Yes/yes	Yes/yes
–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
2000 Hz	350 Hz	600 Hz	600 Hz	250 Hz
IP 67	IP 67	IP 67	IP 67	IP 67
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus
Brass, PTFE coated	Brass, PTFE coated	Brass, PTFE coated	Brass, PTFE coated	Brass, PTFE coated
PPS GF40	PPS GF40	PPS GF40	PPS GF40	PPS GF40
M12 connector, 3-pin, A-coded	M12 connector, 3-pin, A-coded	M12 connector, 3-pin, A-coded	M12 connector, 3-pin, A-coded	M12 connector, 3-pin, A-coded



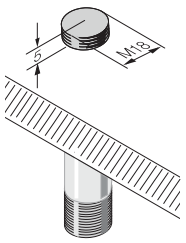








Installation in metal for **BES03YW** requires: Observe clear zone!



■ Reduction in maintenance costs
■ Increase in process quality

The ultra-high temperature-resistant inductive sensors can be used in temperature ranges up to +160 °C.
These sensors are ideally suited to harsh environments in the steel industry, in plastic injection molding machines and in forging and foundry processes.

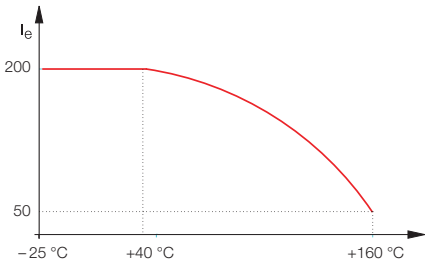
CE

Size		
Mounting type		
Rated switching distance s_n		
PNP	**Ordering code**	
NO	Part number	
Operating voltage U_B		
Voltage drop U_D at I_e		
Rated operating current I_e		
Ambient temperature range		
Switching frequency f		
Degree of protection per IEC 60529		
Housing material		
Sensing surface material		
Connection		

For extreme Applications up to +160 °C
Ultra-high temperature-resistant inductive sensors

	M18×1	**M18×1**	**M30×1.5**	**M30×1.5**
	Flush	Non-flush	Flush	Non-flush
	5 mm	**8 mm**	**10 mm**	**15 mm**
	BES043T	**BES043U**	**BES043W**	**BES043Y**
	BES 515-326-SA49-D-TF-02	BES 515-360-SA13-D-TF-02	BES 515-327-SA22-D-TF-02	BES 515-362-SA4-D-TF-02
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	2.5 V	2.5 V	2.5 V	2.5 V
	200 mA	200 mA	200 mA	200 mA
	–25...+160 °C	**–25...+160 °C**	**–25...+160 °C**	**–25...+160 °C**
	200 Hz	200 Hz	200 Hz	200 Hz
	IP 69K	IP 69K	IP 69K	IP 69K
	Stainless steel 1.4571	Stainless steel 1.4571	Stainless steel 1.4571	Stainless steel 1.4571
	PEEK	PEEK	PEEK	PEEK
	2 m cable FEP, 3×0.34 mm²	2 m cable FEP, 3×0.34 mm²	2 m cable FEP, 3×0.34 mm²	2 m cable FEP, 3×0.34 mm²

Rated operating current



- Designed for wet and washdown conditions
- Resistant to aggressive cleaning agents
- Ecolab and FDA compliant
- Extended temperature ranges

Size		**Ø 12×50 mm**	**M12×50 mm**	**M12×45 mm**	**M12×65 mm**	**Ø 12×54.5 mm**
Mounting type		Flush	Flush	Flush	Flush	Non-flush
Rated switching distance s_n		**2 mm**	**2 mm**	**4 mm**	**4 mm**	**4 mm**
PNP	**Ordering code**	**BES0430**	**BES0444**	**BES0433**	**BES0435**	**BES0431**
NO	Part number	BES G12EE1-PSY20B-S04G-L02	BES M12EE1-PSY20B-S04G-L01	BES M12EE-PSC40B-S04G-L01	BES M12EI-PSC40B-S04G-L01	BES G12EE1-PSY40F-S04G-L02
PNP	**Ordering code**			**BES0432**	**BES0434**	
NC	Part number			BES M12EE-POC40B-S04G-L01	BES M12EI-POC40B-S04G-L01	
NPN	**Ordering code**				**BES0436**	
NO	Part number				BES M12EI-NSC40B-S04G-L01	
Operating voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
Voltage drop U_D at I_e		3.5 V	3.5 V	2 V	2.5 V	3.5 V
Rated operating current I_e		130 mA*	130 mA*	200 mA	200 mA	130 mA*
Reverse polarity/short-circuit protected		Yes/yes	Yes/yes	Yes/yes	Yes/yes	Yes/yes
Ambient temperature range		–40...+105 °C	–40...+105 °C	–25...+85 °C	–25...+85 °C	–40...+105 °C
Switching frequency f		800 Hz	800 Hz	2000 Hz	1000 Hz	400 Hz
Approvals/conformity		CE, cULus, Ecolab, FDA compliant	CE, cULus, Ecolab, FDA compliant	CE, cULus, Ecolab, FDA compliant	CE, cULus, Ecolab, FDA compliant	CE, cULus, Ecolab, FDA compliant
Degree of protection		IP 69K and IP 68 as per BWN Pr. 27	IP 69K and IP 68 as per BWN Pr. 27	IP 69K and IP 68 as per BWN Pr. 20	IP 69K and IP 68 as per BWN Pr. 20	IP 69K and IP 68 as per BWN Pr. 27
Housing material		Stainless steel 1.4571	Stainless steel 1.4571	Stainless steel 1.4404	Stainless steel 1.4404	Stainless steel 1.4571
Sensing surface material		PEEK	PEEK	LCP	LCP	PEEK
Connection		M12 connector	M12 connector	M12 connector	M12 connector	M12 connector

Stainless Steel | IP 68 as per BWN | IP 69K

FDA

ECOLAB

H_2O_2 resistant

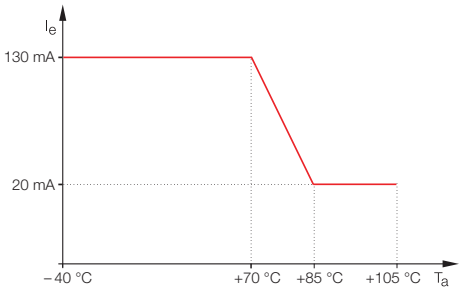
Balluff offers a large selection of sensors for the food industry

PROXINOX

Sensors for the Food Industry
New inductive Proxinox sensors

	M12×54.5 mm	**Ø 18×45 mm**	**M18×45 mm**	**M18×65 mm**	**Ø 18×54.5 mm**	**M18×54.5 mm**
	Non-flush	Flush	Flush	Flush	Non-flush	Non-flush
	4 mm	**5 mm**	**5 mm**	**8 mm**	**8 mm**	**8 mm**
	BES0443	**BES0439**	**BES0441**	**BES0437**	**BES043A**	**BES0442**
	BES G12EE1-PSY40F-S04G-L01	BES G18EE1-PSY50B-S04G-L02	BES M18EE1-PSY50B-S04G-L01	BES M18EI-PSC80B-S04G-L01	BES G18EE1-PSY80F-S04G-L02	BES M18EE1-PSY80F-S04G-L01
				BES0438		
				BES M18EI-POC80B-S04G-L01		
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	3.5 V	3.5 V	3.5 V	2.5 V	3.5 V	3.5 V
	130 mA*	130 mA*	130 mA*	200 mA	130 mA*	130 mA*
	Yes/yes	Yes/yes	Yes/yes	Yes/yes	Yes/yes	Yes/yes
	–40...+105 °C	–40...+105 °C	–40...+105 °C	–40...+85 °C	–40...+105 °C	–40...+105 °C
	400 Hz	500 Hz	500 Hz	700 Hz	200 Hz	200 Hz
	CE, cULus, Ecolab, FDA compliant	CE, cULus, Ecolab, FDA compliant	CE, cULus, Ecolab, FDA compliant	CE, cULus, Ecolab, FDA compliant	CE, cULus, Ecolab, FDA compliant	CE, cULus, Ecolab, FDA compliant
	IP 69K and IP 68 as per BWN Pr. 27	IP 69K and IP 68 as per BWN Pr. 27	IP 69K and IP 68 as per BWN Pr. 27	IP 69K and IP 68 as per BWN Pr. 20	IP 69K and IP 68 as per BWN Pr. 27	IP 69K and IP 68 as per BWN Pr. 27
	Stainless steel 1.4571	Stainless steel 1.4571	Stainless steel 1.4571	Stainless steel 1.4404	Stainless steel 1.4571	Stainless steel 1.4571
	PEEK	PEEK	PEEK	PEEK	PEEK	PEEK
	M12 connector	M12 connector	M12 connector	M12 connector	M12 connector	M12 connector

***Current decrease curve**



Steam jet tested!

Compact sensor designs with long switching distances are required in material handling technology. In addition, the switching and operating state of the sensor can be identified from far away.

Housing optimized for material handling technology

- Highly visible corner LEDs
- Sensor head can be mounted in five positions
- Connector outlet set to position within a 270° range

Factor 1 sensors are the first choice for welding applications because they have a Teflon-coated sensing face and are immune to magnetic fields.

Size	
Mounting type	
Rated switching distance s_n	
PNP NO	**Ordering code**
	Part number
Operating voltage U_B	
Rated operating current I_e	
Reverse polarity/short-circuit protected	
Ambient temperature range	
Switching frequency f	
Sensor degree of protection acc. to IEC 60529	
Approvals	
Housing material	
Material of sensing face	
Connection	

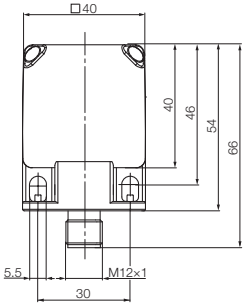
Inductive Q40 Block Sensors with Corner LEDs
Optimized for material handling technology applications

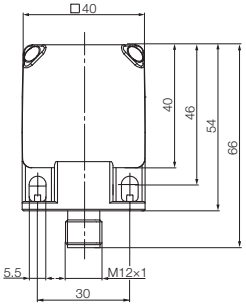
Factor 1
Magnetic field immune

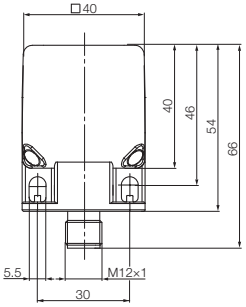
Factor 1
Magnetic field immune

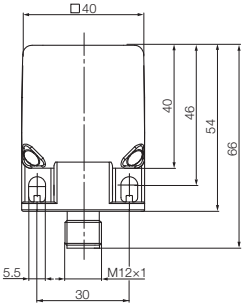
Factor 1
Magnetic field immune

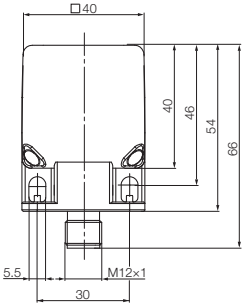
	40×40×66 mm	**40×40×66 mm**	**40×40×66 mm**	**40×40×66 mm**	**40×40×66 mm**
	Flush	Non-flush	Flush	Non-flush	Non-flush
	20 mm	**40 mm**	**20 mm**	**35 mm**	**40 mm**
	BES0306	**BES0308**	**BES0305**	**BES0307**	**BES0304**
	BES Q40KFU-PSC20B-S04G-012	BES Q40KFU-PSC40F-S04G-012	BES Q40KFU-PSC20A-S04G-012	BES Q40KFU-PSC35E-S04G-012	BES Q40KFU-PAC40E-S04G-012
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	200 mA	200 mA	200 mA	200 mA	200 mA
	Yes/yes	Yes/yes	Yes/yes	Yes/yes	Yes/yes
	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
	100 Hz	60 Hz	200 Hz	200 Hz	200 Hz
	IP 67	IP 67	IP 67	IP 67	IP 67
	CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus
	PA	PA	PA	PA	PA
	PA	PA	PA Teflon coated	PA Teflon coated	PA Teflon coated
	M12 connector, 3-pin, A-coded	M12 connector, 3-pin, A-coded	M12 connector, 3-pin, A-coded	M12 connector, 3-pin, A-coded	M12 connector, 3-pin, A-coded











- Easy installation (since they can be mounted side-by-side and universally installed, stacked with a spacing of > 20 mm)
- Very reliable (due to inductive sensor principle)
- Optimal for the detection of small parts (with integrated pulse extension, permanently set)

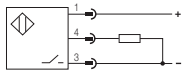
Applications

- Detection of nails, screws, welded studs, rivets or similar
- Ejection monitoring
- Part counting
- Wire-breakage monitoring
- Nail machines for pallet manufacturing
- Infeed monitoring in assembly technology
- Jam detection in feed tubes

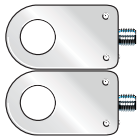
Inductive Ring Sensors BES IKVS

Optimal for automated assembly

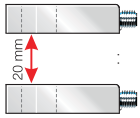
Size		35×60×20 mm	35×60×20 mm	35×60×20 mm
Inside diameter d_w		Ø 10.1 mm	Ø 15.1 mm	Ø 25.1 mm
Minimum object size steel taper (St 37)		Ø 2 mm	Ø 3 mm	Ø 4 mm
Target velocity max.		60 m/s	60 m/s	60 m/s
PNP	**Ordering code**	**BES03JA**	**BES03JC**	**BES03JH**
NO	Part number	BES IKVS-010.23-G-S4	BES IKVS-015.23-G-S4	BES IKVS-025.23-G-S4
Operating voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC
Voltage drop U_d at I_e		≤ 2 V	≤ 2 V	≤ 2 V
Rated insulation voltage U_i		75 V DC	75 V DC	75 V DC
Rated operating current I_e		400 mA	400 mA	400 mA
Rated operating current I_0 max.		≤ 10 mA	≤ 10 mA	≤ 10 mA
Reverse polarity/short-circuit protected		Yes/yes	Yes/yes	Yes/yes
Ambient temperature T_a		–25...+70 °C	–25...+70 °C	–25...+70 °C
Function indicator		Yes	Yes	Yes
Degree of protection per IEC 60529		IP 65	IP 65	IP 65
Housing material		Plastic	Plastic	Plastic
Material of sensing face		Plastic	Plastic	Plastic
Connection		M12 connector, 3-pin, A-coded	M12 connector, 3-pin, A-coded	M12 connector, 3-pin, A-coded
Pulse prolongation		60 ms	60 ms	60 ms



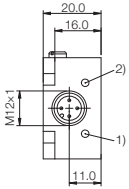
Installation in series:

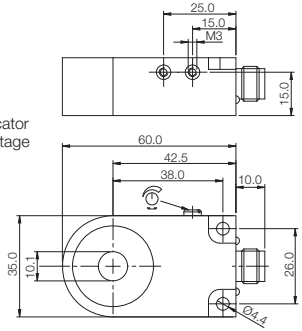


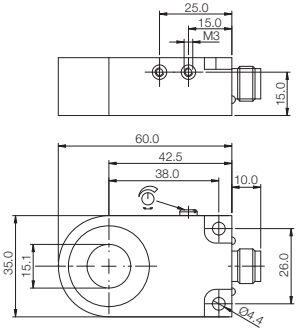
Installation in a stack:

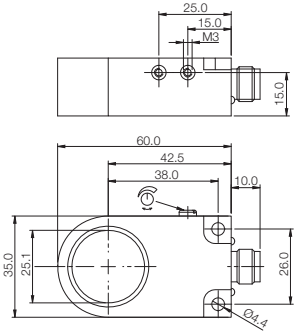


1) LED function indicator
2) LED operating voltage









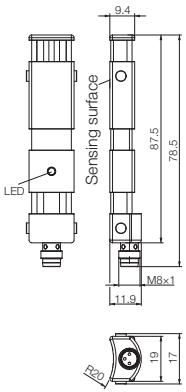
Inductive tube sensors complement the line of ring sensors. Optimized for tube infeeds in automated assembly, they detect small parts easily and reliably.

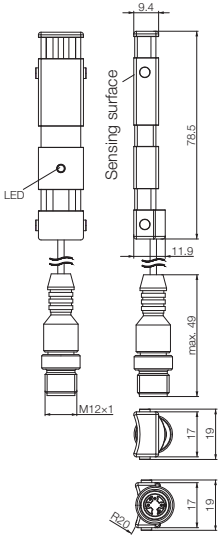
- Simple attachment to infeed tube
- Pulse extension of 150 ms results in a reliable detection of fast-moving parts
- Object speed max. 20 m/s

Inductive Tube Sensors BES Z06K
Fast and easy to install

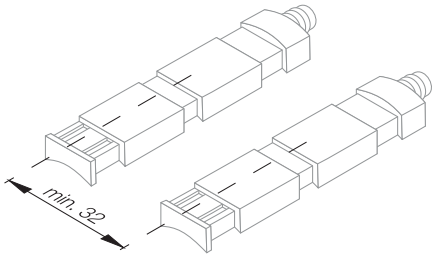
Size		17×78.5×11.9 mm	17×78.5×11.9 mm
Minimum object size		Screw M3×5	Screw M3×5
Rated switching distance s_n		16 mm	16 mm
PNP	**Ordering code**	**BES0428**	**BES0429**
NO	Part number	BES Z06K-PSC16F-S49G	BES Z06K-PSC16F-BP00,1-GS04
Operating voltage U_B		10...30 V DC	10...30 V DC
Rated operating current I_e		200 mA	200 mA
Reverse polarity/short-circuit protected		Yes/yes	Yes/yes
Ambient temperature T_a		–25...+70 °C	–25...+70 °C
Function indicator		Yes	Yes
Degree of protection per IEC 60529		IP 67	IP 67
Housing material		PA 6.6	PA 6.6
Connection		M8 connector, 3-pin	M12 connector, 3-pin, A-coded with 0.1 m cable PUR
Pulse prolongation		150 ms	150 ms

Rated switching distance s_n based on FE360 steel plate (18×18×1 mm).

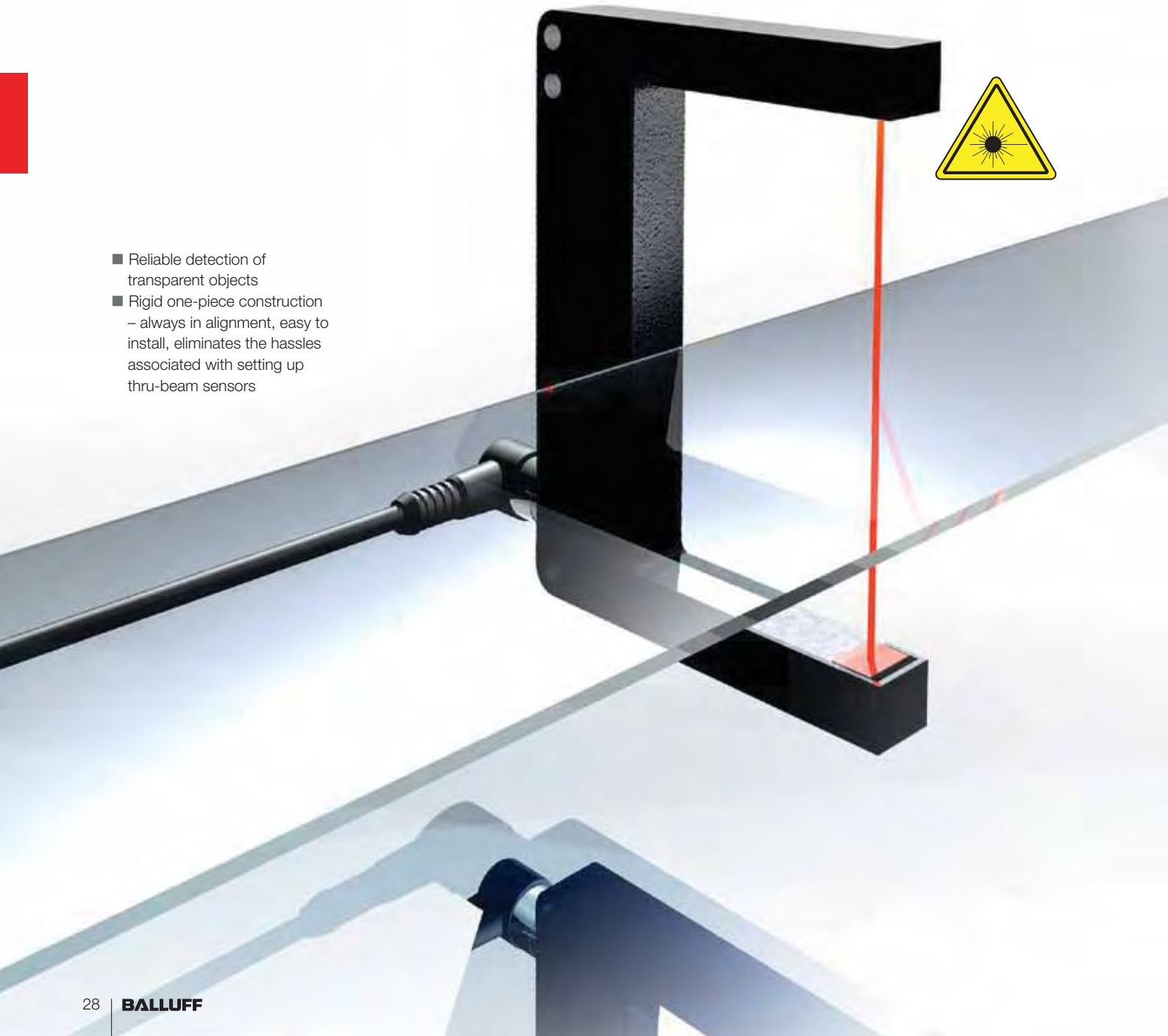




Center-line spacing for side-by-side mounting



- Reliable detection of transparent objects
- Rigid one-piece construction – always in alignment, easy to install, eliminates the hassles associated with setting up thru-beam sensors



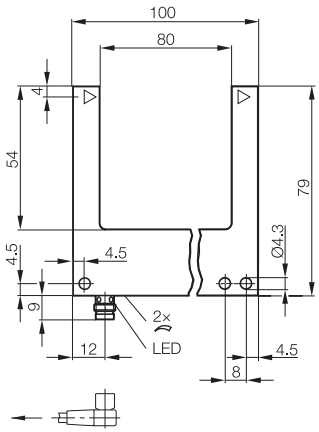
Reliable Transparency Detection
BGL Laser Fork Sensors

Maximum reliability – simple installation
Balluff BGL laser fork sensors ensure completely reliable detection of transparent objects. These sensors also provide the unsurpassed advantages offered by all of Balluff's fork sensors: the transmitter and receiver do not need to be aligned. The rugged metal housings contain both the emitter and receiver with pre-aligned optics. This aids in installation, reduces mechanical setups, and ends misalignment nuisances.

■ **Ordering code**
■ Part number

		BGL002T	BGL 80A-009-S49	BGL002U	BGL 80A-010-S49
Switching output	PNP	■			
	NPN			■	
Switching type	NC/NO contact selection	■		■	
Connection	M8 connector, 3-pin	■		■	
Fork opening	80 mm	■		■	
	120 mm				
Light type		Laser			
Switching frequency		5000 Hz			
Degree of protection		IP 67			
Housing material		Gd-Zn			
Optical surface		Glass			

For additional information go to our website at **www.balluff.com**



- Detect fluids with a water content > 15 %
- Detection independent of color
- Sensor can be taught to ignore thin film fluid buildup on container walls

Balluff has widened its scope of expertise in through-beam fork sensors by offering sensors for fluid detection. Detect the level of clear, colored, or opaque fluids with a water content > 15% through transparent container walls.

Fork Sensors for Fluid Detection

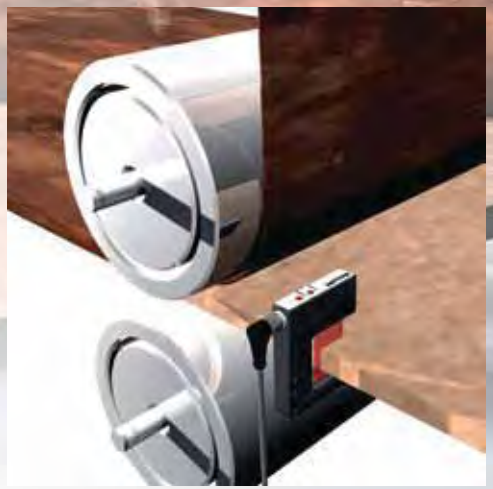
Reliable level detection through transparent container walls

■ **Ordering code**
□ Part number

		BGL003J	BGL 30A-011-S49	**BGL003K**	BGL 30A-012-S49	**BGL003L**	BGL 80A-011-S49	**BGL003M**	BGL 80A-012-S49
Switching output	PNP	■				■			
	NPN			■				■	
Switching type	NC/NO contact selection	■		■		■		■	
Connection	M8 connector, 3-pin	■		■		■		■	
Fork opening	30 mm	■		■					
	80 mm					■		■	
Light type		Infrared							
Switching frequency		2 kHz							
Degree of protection		IP 67							
Housing material		Gd-Zn							
Optical surface		Glass							

For additional information visit our website at **www.balluff.com**

- Track web movement
- High degree of process reliability
- Improved efficiency



Reliable Web Edge Control

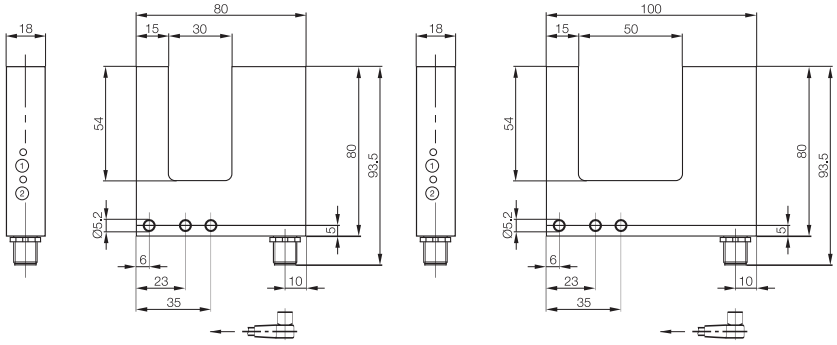
BGL fork sensors: analog array edge position monitoring

In-process monitoring
Absolute position detection based on how far an object enters/blocks the sensor's detection beam. For applications that require exact position measurement with either the 30 mm or 50 mm sensing window and the 54 mm measuring area thick or thin objects or material in continuous webs can be detected to a resolution of 0.08 mm.

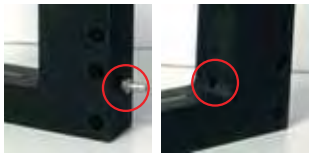
Technical highlights
- Excellent resolution and repeatability
- Configurable digital and analog outputs
- Up to 4 selectable switch points

■ **Ordering code**
□ Part number

		BGL002Z	BGL 30C-001-S4	**BGL0037**	BGL 50C-001-S4	**BGL0033**	BGL 30C-005-S4	**BGL0031**	BGL 30C-003-S4	**BGL003C**	BGL 50C-005-S4	**BGL0039**	BGL 50C-003-S4	**BGL0035**	BGL 30C-007-S4	**BGL003F**	BGL 50C-007-S4
Basic: 2 switching outputs		■		■													
Advanced: 1 analog output with 1 switching / error output						■		■		■		■					
Premium: IO-Link														on request			
Fork opening	30 mm	■				■		■						■			
	50 mm			■						■		■				■	
Switching output	PNP	■		■		■		■		■		■		■		■	
	NPN	on request															
Analog output	0...10 V DC					■				■							
	4...20 mA							■				■					
Light type		Red light															
Measurement field length		25 mm															
Resolution		≤ 0.1 mm															
Housing material		Al anodized															
Connection		M12 connector, 4-pin															

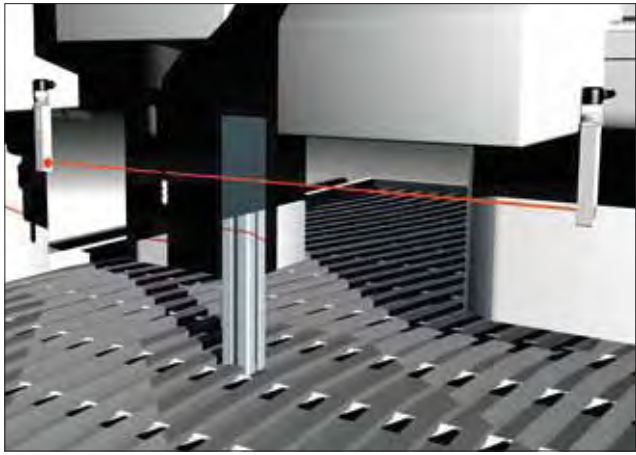


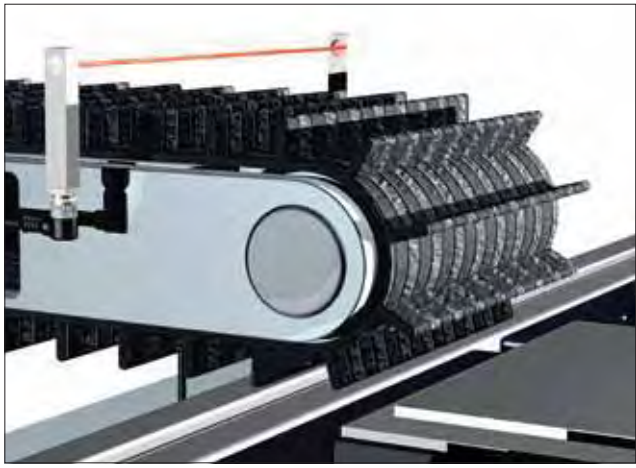
Detection and compensation of contamination
Integrated air nozzle designed to prevent dust and debris from accumulating on optical elements.



Reliably detect the smallest parts
Balluff thru-beam sensors BOS Q08M are innovative, compact products that reach a high level of performance. The BOS Q08M sensors offer right angle thru-beam sensing. Nothing else produces comparable results under similar conditions. These compact and rugged sensors are designed to be installed and operated in tight spaces.

- Compact design for limited space
- Rugged metal housing
- Reliable detection of small parts up to 0.4 mm (PinPoint red light) or 0.28 mm (laser)
- Patented mounting concept for Bosch profiles that allows quick, precise positioning





Red Light and Laser Thru-beam Sensors BOS Q08M

Extreme accuracy in a compact, high-performance design

PinPoint

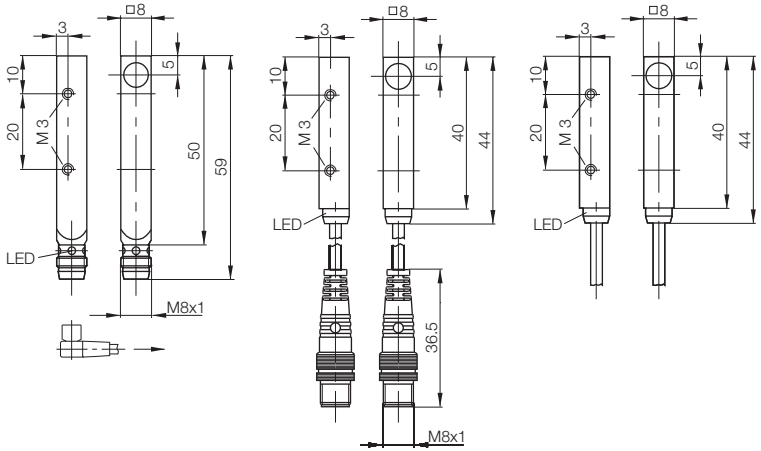
Laser

	Emitter				Receiver							Emitter			Receiver						
Ordering code	**BOS00YK**	**BOS00YH**	BOS 08M-X-KS20-00,2-S49	**BOS00YJ**	BOS 08M-X-KS20-02	**BOS00YF**	BOS 08M-PS-KE20-S49	**BOS00YC**	BOS 08M-PS-KE20-00,2-S49	**BOS00YE**	BOS 08M-PS-KE20-02	**BOS00YA**	BOS 08M-PO-KE20-S49	**BOS00Y8**	BOS 08M-PO-KE20-00,2-S49	**BOS00Y9**	BOS 08M-PO-KE20-02	**BOS018K**	BOS 08M-X-LS20-S49	**BOS019M**	BOS 08M-X-LS20-00,2-S49	**BOS018M**	BOS 08M-X-LS20-02	**BOS0199**	BOS 08M-PS-LE20-S49	**BOS0197**	BOS 08M-PS-LE20-00,2-S49	**BOS0198**	BOS 08M-PS-LE20-02	**BOS0196**	BOS 08M-PO-LE20-S49	**BOS0194**	BOS 08M-PO-LE20-00.2-S49	**BOS0195**	BOS 08M-PO-LE20-02
PNP						■	■	■	■	■	■	■												■	■	■	■	■	■	■	■	■	■
NPN						on request																		on request									
NO contact						■	■	■																■	■	■							
NC contact												■	■	■	■	■	■												■	■	■	■	■	■
Connection: M8 connector, 3-pin	■					■						■						■						■					■				
Connection: Cable with M8 connector, 3-pin			■				■							■						■					■					■			
Connection: Cable				■				■								■						■						■					■
Range	2.2 m																	0...3 m															
Light type	Red light (PinPoint LED)																	Laser (laser class 1)															
Switching frequency	400 Hz																	400 Hz															
Smallest detectable part	0.4 mm																	0.28 mm															
Degree of protection	IP 67																	IP 67															
Housing material	Nickel-plated Gd-Zn																	Nickel-plated Gd-Zn															
Optical surface	PMMA																	PMMA															

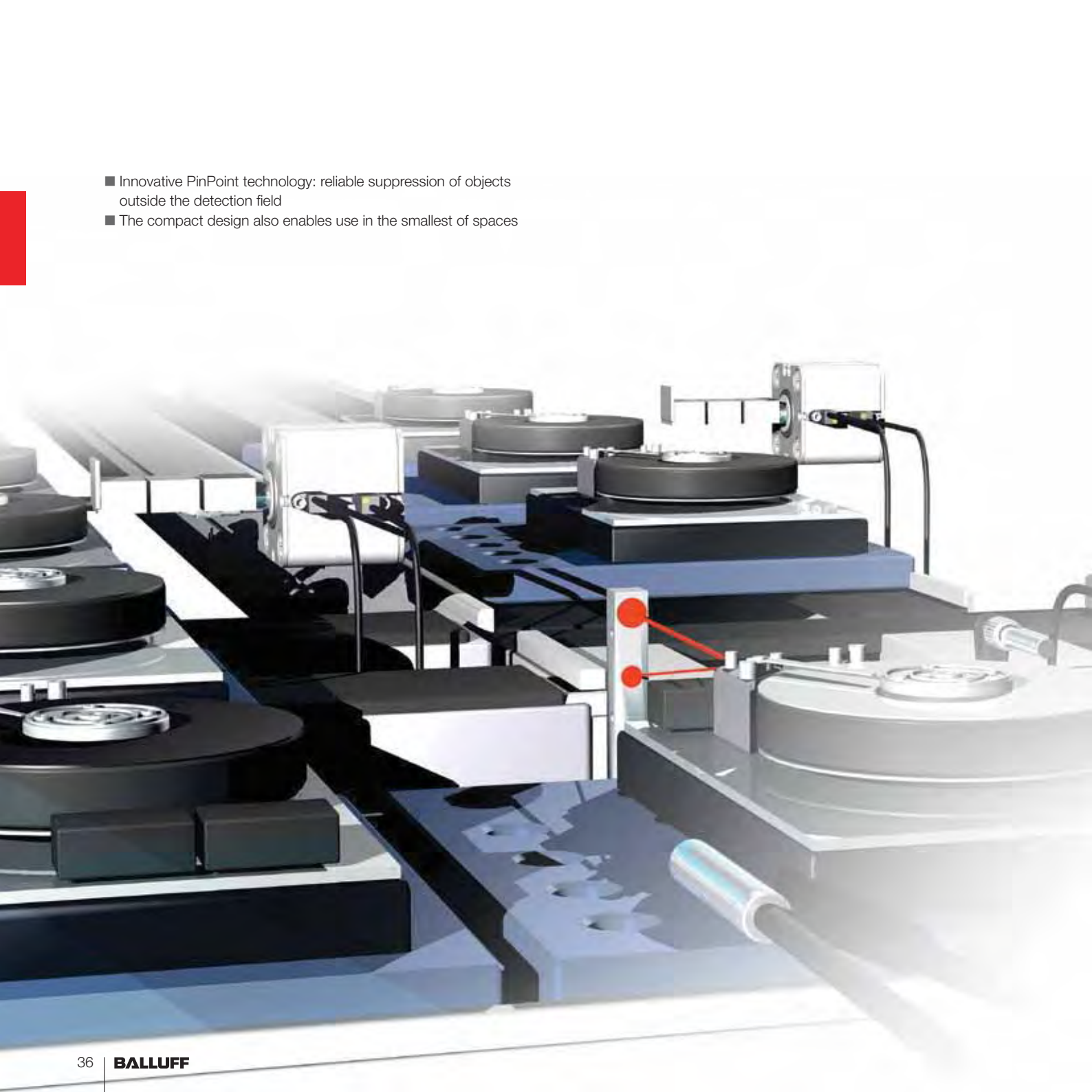
For additional information visit our website at **www.balluff.com**

Clamp holder

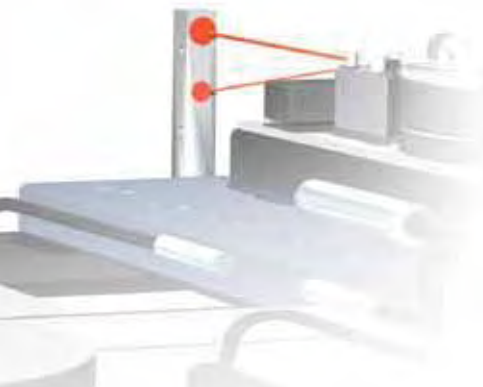
For Bosch profile: **BES Q08-KH-3**



- Innovative PinPoint technology: reliable suppression of objects outside the detection field
- The compact design also enables use in the smallest of spaces



BOS Q08M Diffuse Sensor with Fixed Background Suppression
Quick installation



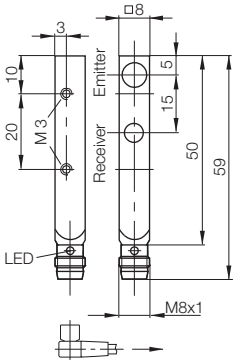
■ **Ordering code**
□ Part number

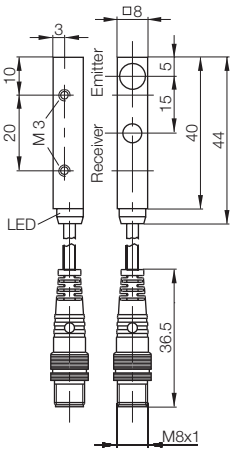
		Diffuse sensor					
		BOS0160 BOS Q08M-PS-KF20-S49	**BOS0163** BOS Q08M-PS-KF20-00,2-S49	**BOS0161** BOS Q08M-PS-KF20-02	**BOS0164** BOS Q08M-PO-KF20-S49	**BOS0168** BOS Q08M-PO-KF20-00.2-S49	**BOS0165** BOS Q08M-PO-KF20-02
Switching output	PNP	■	■	■	■	■	■
	NPN	on request					
Switching type	NO contact	■	■	■			
	NC contact				■	■	■
Connection	M8 connector, 3-pin	■			■		
	Cable with M8 connector, 3-pin		■			■	
	Cable			■			■
Sensing distance		5...50 mm					
Light type		Red light PinPoint LED					
Switching frequency		400 Hz					
Degree of protection		IP 67					
Housing material		Nickel-plated Gd-Zn					
Optical surface		PMMA					

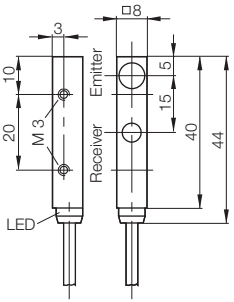
For additional information visit our website at **www.balluff.com**

Rapid application - high reliability
Only Balluff offers the powerful combination of fixed background suppression and homogeneous red light through innovative PinPoint technology. All of this is integrated into a compact design, enabling simple installation in even the most confined spaces.

A new, patented mounting bracket also ensures flush installation in aluminum profiles.
For Bosch profile:
BES Q08-KH-3







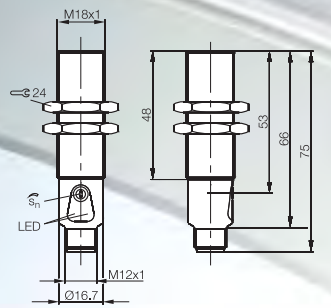
- Reliable repeat accuracy as a result of powerful background suppression
- Simple, fast mounting
- Large ranges
- Highly visible red light
- Precise switching response

Precise switching response – excellent repeat accuracy

Cutting-edge LED technology and the latest Fresnel lenses are combined in this unit to form an innovative and powerful photoelectric sensor. In practice this means reliable background suppression, improved repeat accuracy and a precise switching response even at large distances.

Technical highlights

- Large operating range
- Rugged M18 metal housing
- State-of-the-art LED technology with sharply contoured light spot



Photoelectric Red Light Sensors M18
For maximum precision

■ **Ordering code**
□ Part number

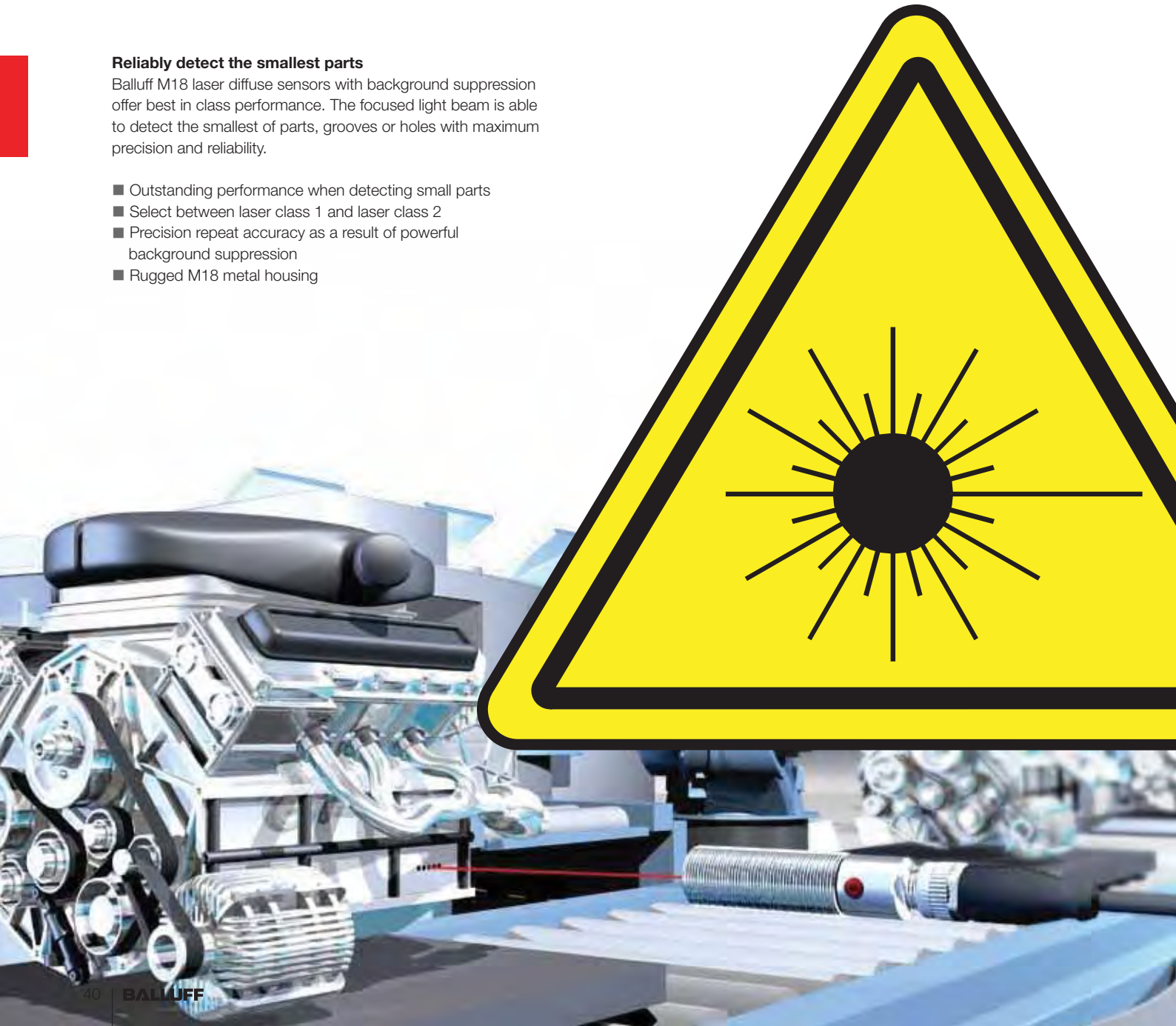
		BOS014W	BOS 18M-PA-RH22-S4	**BOS019N**	BOS 18M-PSV-RH22-S4	**BOS019P**	BOS 18M-PS-RH22-S4	**BOS01CA**	BOS 18M-PA-RD21-S4	**BOS01E7**	BOS 18M-PS-RD21-S4	**BOS01E8**	BOS 18M-PO-RD21-S4	**BOS01CF**	BOS 18M-PA-RD20-S4	**BOS01C1**	BOS 18M-PS-RD20-S4	**BOS01E3**	BOS 18M-PO-RD20-S4	**BOS01CE**	BOS 18M-PA-PR20-S4	**BOS01C1**	BOS 18M-PS-PR20-S4	**BOS01CZ**	BOS 18M-PO-PR20-S4	**BOS01C0**	BOS 18M-X-RS20-S4	**BOS01EP**	BOS 18M-XT-RS20-S4	**BOS01CC**	BOS 18M-PA-RE20-S4	**BOS01C2**	BOS 18M-PS-RE20-S4	**BOS01EE**	BOS 18M-PO-RE20-S4
Type	Diffuse sensor with background suppression	■		■		■																												
	Diffuse sensor energetic							■		■		■		■		■		■																
	Retroreflective sensor																			■		■		■										
	Through-beam emitter																								■									
	Through-beam emitter with test input																										■							
	Thru-beam receiver																												■		■		■	
Switching output	PNP complementary	■						■						■						■														
	PNP NO contact, error output			■																														
	PNP NO contact					■				■						■						■										■		
	PNP NC											■						■						■										■
Switching frequency	400 Hz							■		■		■		■		■		■		■		■		■					■		■		■	
	500 Hz	■		■		■																												
Sensing range	30…300 mm	■		■		■																												
	1...300 mm							■		■		■																						
	1...600 mm													■		■		■																
	0.1...7 m																			■		■		■										
	0...20 m																								■		■		■		■		■	
Setting		10-turn potentiometer						270° pot																										
Gray value shift		≤ 15 %																																
Light type		Red light																																
Housing material		Nickel-plated brass																																
Connection		M12 connector, 4-pin																																

NPN variants available from summer 2011. For additional information visit our website at **www.balluff.com**

Accessories
- Reflector BOS R-1 (ordering code: **BAM00UK**)
- Straight connector, 2 m PUR, other lengths on request
  BCC M415-0000-1A-003-PX0434-020 (ordering code: **BCC032F**)
- Right-angle connector, 2 m PUR, other lengths on request
  BCC M425-0000-1A-003-PX0434-020 (ordering code: **BCC032Y**)

Reliably detect the smallest parts
Balluff M18 laser diffuse sensors with background suppression offer best in class performance. The focused light beam is able to detect the smallest of parts, grooves or holes with maximum precision and reliability.

- Outstanding performance when detecting small parts
- Select between laser class 1 and laser class 2
- Precision repeat accuracy as a result of powerful background suppression
- Rugged M18 metal housing

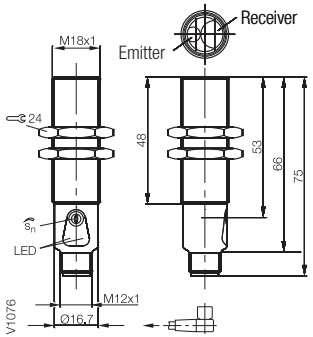


Photoelectric Laser Sensors M18

With 150 mm background suppression for outstanding detection of small parts

Type			Diffuse sensor with background suppression, laser class 1	Diffuse sensor with background suppression, laser class 2
Detection range			30…150 mm	30…150 mm
PNP	Light-on with error output	**Ordering code**	**BOS01C4**	**BOS002K**
		Part number	BOS 18M-PSV-LH23-S4	BOS 18M-PSV-LH22-S4
PNP	Light-on	**Ordering code**		**BOS002H**
		Part number		BOS 18M-PS-LH22-S4
PNP	Light- and dark-on	**Ordering code**	**BOS01C5**	
		Part number	BOS 18M-PA-LH23-S4	
NPN	Light-on with error output	**Ordering code**		**BOS001L**
		Part number		BOS 18M-NSV-LH22-S4
NPN	Dark-on with error output	**Ordering code**		**BOS001H**
		Part number		BOS 18M-NOV-LH22-S4
Operating voltage U_B			10…30 V DC	10…30 V DC
Setting			10-turn potentiometer	10-turn potentiometer
Switching frequency			500 Hz	500 Hz
Housing material			Nickel-plated brass	Nickel-plated brass
Optical surface			PMMA	PMMA
Degree of protection per IEC 60529			IP 67	IP 67
Ambient temperature range T_a			–5…+55 °C	–5…+55 °C
Connection			M12 connector, 4-pin	M12 connector, 4-pin

For additional information visit our website at **www.balluff.com**



- Accurate switching characteristics for precision positioning tasks
- High ranges and compact design for greater freedom of system design
- Highly visible red light/laser light for precision alignment
- LEDs visible from all sides
- Varied mounting options
- Laser variants ideal for small part detection
- Outstanding price/performance ratio

Accessories

- Reflector for red light variants BOS R-1 (ordering code: **BAM00UK**)
- Reflector for laser variants BOS R-22 (ordering code: **BAM00UY**)
- Lens protector BAM PC-XO-006-23K-1 (ordering code: **BAM01L8**)
- Mounting bracket BMS CS-M-D12-B23K-05 (ordering code: **BAM01AW**)
- Straight connector, 2 m PUR, other lengths on request BCC M415-0000-1A-003-PX0434-020 (ordering code: **BCC032F**)
- Right-angle connector, 2 m PUR, other lengths on request BCC M425-0000-1A-003-PX0434-020 (ordering code: **BCC032Y**)

CE

Type			
LED red light	Detection range		
	PNP	NC/NO selection	**Ordering code**
			Part number
	NPN	NC/NO selection	**Ordering code**
			Part number
	Emitter		**Ordering code**
			Part number
	Operating voltage U_B		
	Setting		
	Switching frequency		
	Housing material		
	Optical surface		
	Degree of protection per IEC 60529		
	Ambient temperature range T_a		
	Connection		

Laser class 1 / Laser class 2	Detection range		
	PNP	NC/NO selection	**Ordering code**
			Part number
	NPN	NC/NO selection	**Ordering code**
			Part number
	PNP	NC/NO selection	**Ordering code**
			Part number
	NPN	NC/NO selection	**Ordering code**
			Part number
	Emitter		**Ordering code**
			Part number
	Operating voltage U_B		
	Setting		
	Switching frequency		
	Housing material		
	Optical surface		
	Degree of protection per IEC 60529		
	Ambient temperature range T_a		
	Connection		

New Photoelectric Sensors BOS 23K
Red light and laser provide a competitive edge

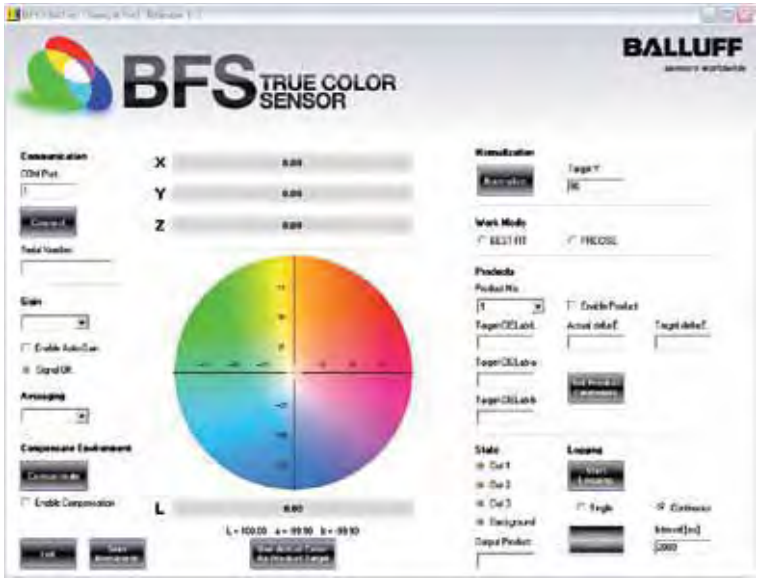
	Diffuse sensor	Diffuse sensor with background suppression	Retro-reflective sensor	Thru-beam sensor Receiver	Thru-beam sensor Emitter
	0...2 m	**0...1.2 m**	**0...14 m**	**0...25 m**	**0...25 m**
	BOS016Z	**BOS0178**	**BOS016P**	**BOS016F**	
	BOS 23K-PU-RD10-S4	BOS 23K-PU-RH10-S4	BOS 23K-PU-RR10-S4	BOS 23K-PU-RE10-S4	
	BOS0170	**BOS0179**	**BOS016R**	**BOS016H**	
	BOS 23K-NU-RD10-S4	BOS 23K-NU-RH10-S4	BOS 23K-NU-RR10-S4	BOS 23K-NU-RE10-S4	
					BOS016E
					BOS 23K-XT-RS11-S4
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	Teach-in	18-turn potentiometer	Teach-in	Teach-in	Teach-in
	600 Hz	600 Hz	600 Hz	500 Hz	
	ABS	ABS	ABS	ABS	ABS
	PMMA	PMMA	PMMA	PMMA	PMMA
	IP 67	IP 67	IP 67	IP 67	IP 67
	–20...+60 °C	–20...+60 °C	–20...+60 °C	–20...+60 °C	–20...+60 °C
	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin

	0...1.2 m	**0...1.2 m**	**0...14 m**	**0...30 m**	**0...30 m**
		BOS017C	**BOS016U**	**BOS016L**	
		BOS 23K-PU-LH10-S4	BOS 23K-PU-LR10-S4	BOS 23K-PU-LE10-S4	
		BOS017E	**BOS016W**	**BOS016M**	
		BOS 23K-NU-LH10-S4	BOS 23K-NU-LR10-S4	BOS 23K-NU-LE10-S4	
	BOS0175	**BOS017H**			
	BOS 23K-PU-LD20-S4	BOS 23K-PU-LH20-S4			
	BOS0176	**BOS017J**			
	BOS 23K-NU-LD20-S4	BOS 23K-NU-LH20-S4			
					BOS 016K
					BOS 23K-XT-LS11-S4
	10…30 V DC	10…30 V DC	10…30 V DC	10…30 V DC	10…30 V DC
	Teach-in	Mech. setting (multiple speed)	Teach-in	Teach-in	Teach-in
	600 Hz	1 kHz	2 kHz	3,5 kHz	
	ABS	ABS	ABS	ABS	ABS
	PMMA	PMMA	PMMA	PMMA	PMMA
	IP67	IP67	IP67	IP67	IP67
	–20…+60°C	–20…+60°C	–20…+60°C	–20…+60°C	–20…+60°C
	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin

- Distinguishes between different color shades
- Large sensing range of 400 mm
- High degree of flexibility through fiber adaptation
- Simple configuration and visualization using software
- Robust metal housing

Balluff has raised the bar in photoelectrics with the True-color Sensor BFS 33. The sensor succeeds where existing RGB sensors reach their limits by using the lab color space. The sensor can detect minute differences in color on injection molded parts and opens up a wealth of new possibilities in color detection.

The sensor uses three digital outputs and a serial interface to perform evaluations. The lab color space values are transmitted directly via this interface.



True-color Sensor BFS 33M

Distinguishes between different color shades

400 mm sensing range possible with additional lens!

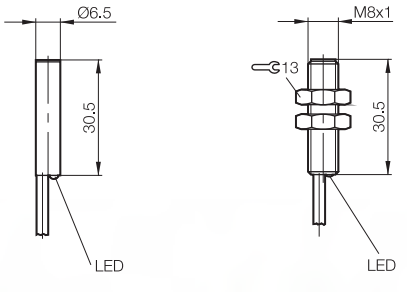
Type	True-color sensor BFS
Ordering code	**BFS000L**
Part number	BFS 33M-GSS-F01-PU-02
Channels (outputs)	3
Color space	CIELab
Switching frequency	1.5 kHz (on 3 products)
Resolution	8 enhancement settings, 12 bit
Color resolution	< 0.5 dE
Repeat accuracy	< 1 dE
Protection class	IP 54
Ambient temperature range T_a	-10...+55 °C
Housing material	Al coated

Type	Plastic fiber optic BFO
Ordering code	**BFO0066**
Part number	BFO D22-XB-LB-EAK-15-SA1-02
Operating principle	Buttons
Sensing distance	5...80 mm, up to 400 mm with additional lens
Dispersion angle	60°
Connection	SMA connector
Length	2000 mm
Ambient temperature range T_a	-55...+70 °C
Fiber optic material	Plastic POF
Sleeve material	Plastic

Industries

- Automobile industry
- Plastics processing
- Packaging industry
- Handling and assembly
- Printing industry
- Timber processing

Model		BMF 07M	BMF 08M	BMF 12M
Maximum switching distance (with BAM01EL)		90 mm	90 mm	90 mm
PNP NO	**Ordering code**	**BMF000E**	**BMF000P**	**BMF00C7**
	Part number	BMF 07M-PS-C-2-KPU-02	BMF 08M-PS-C-2-KPU-02	BMF 12M-PS-C-2-S4
Operating voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC
Reverse polarity/short-circuit protected		Yes/yes	Yes/yes	Yes/yes
Function indicator		Yellow LED	Yellow LED	Yellow LED
Ambient temperature range T_a		–25...+85 °C	–25...+85 °C	–25...+70 °C
Degree of protection per IEC 60529		IP 67	IP 67	IP 67
Connection		2 m cable PUR, 3×0.14 mm²	2 m cable PUR, 3×0.14 mm²	M12 connector, 3-pin



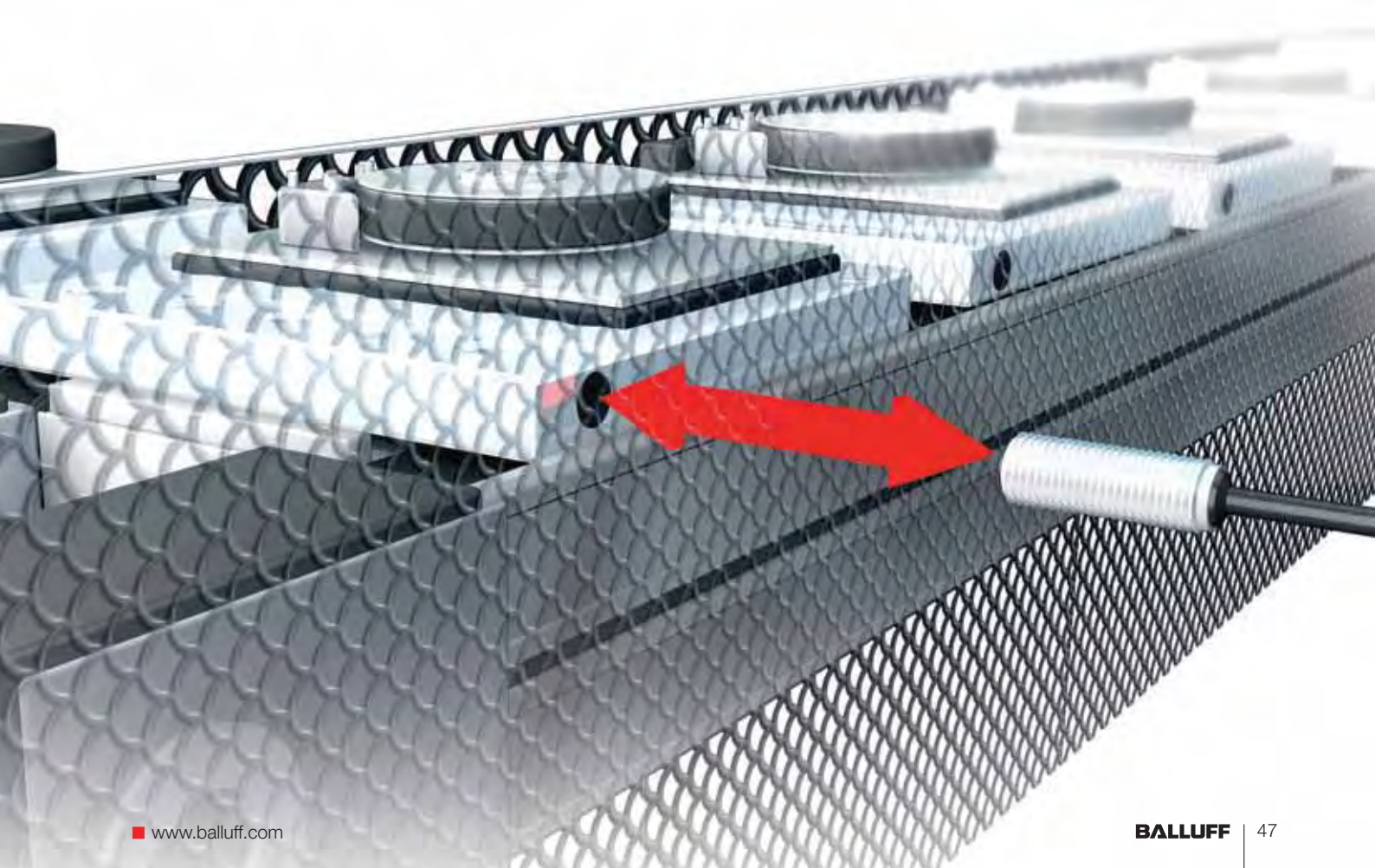
Size	Ø 15 mm	Ø 15 mm	Ø 25 mm with M5 screw hole	Ø 22.1 mm with M5 screw hole
Ordering code	**BAM01EJ**	**BAM01EK**	**BAM01EL**	**BAM01EM**
Part number	BAM TG-MF-006	BAM TG-MF-007	BAM TG-MF-008	BAM TG-MF-009
Height	10 mm	15 mm	15 mm	10.5 mm
Maximum switching distance	40 mm	65 mm	90 mm	40 mm

Assured switching is guaranteed from 0 mm to the switching distance indicated in the table.
The specified switching distances are determined from series measurements and should be considered a starting point for selecting a suitable magnet.

Cylindrical Magnetic Field Sensors for Long Operating Ranges
Miniature design, long switching distances

Cylindrical magnetic field sensors are characterized by their small, extremely compact design. The new magnets with cylindrical magnetic field sensors for position applications are ideal for extremely long switching distances, which means that you can query positions up to 90 mm away using one sensor with a diameter of 6.5 mm without making contact. These sensors are industrial grade and resistant to soiling. Positions can also be retrieved through containers or pipes because magnetic fields can penetrate many non-metallic materials. The detection of codes using magnets is also possible.

- Non-contact position requests up to a distance of 90 mm
- Object detection through non-metallic materials
- Compact sensors and small magnets provide the perfect basis for installation



Ultrabright LED

Easy troubleshooting from far away (25 m in bright factory building).

New mounting concept

Solid hold in the slot, sensor cannot be wrenched from the slot.

Knurled screw

Sensor screws in firmly, extremely secure hold in any slot (e.g. Parker, Festo, SMC, Bosch).

Minimum length: 23 mm!
8 mm shorter than previous model.

Can also be used in applications with limited space, short stroke cylinders and grippers.

Can be installed from above, easy to install with hexagon socket or slot screwdriver

Size			BMF 235	BMF 235
Dimensions (H×W×L)			5.5×5×23.5 mm	5.5×5×23.5 mm
PNP	NO	**Ordering code**	**BMF00C4**	**BMF00AR**
		Part number	BMF 235K-PS-C-2A-SA2-S49-00,3	BMF 235K-PS-C-2A-PU-02
	NC	**Ordering code**	**BMF00C6**	**BMF00AT**
		Part number	BMF 235K-PO-C-2A-SA2-S49-00,3	BMF 235K-PO-C-2A-PU-02
NPN	NO	**Ordering code**	**BMF00C2**	**BMF00AU**
		Part number	BMF 235K-NS-C-2A-SA2-S49-00,3	BMF 235K-NS-C-2A-PU-02
	NC	**Ordering code**	**BMF00C3**	**BMF00AW**
		Part number	BMF 235K-NO-C-2A-SA2-S49-00,3	BMF 235K-NO-C-2A-PU-02
Operating voltage U_B			10...30 V DC	10...30 V DC
Ambient temperature T_a			–25...+85 °C	–25...+85 °C
Degree of protection per IEC 60529			IP 67	IP 67
Housing material			Plastic	Plastic
Connection			0.3 m cable PUR with M8 connector, 3-pin	2 m cable PUR, 3×0.14 mm²
Approval			CE, cULus	CE, cULus
Assembly			Can be installed from above	Can be installed from above
Cylinder profile			T-slot	T-slot

Other plug and cable variants are available in addition to V-Twin models.
For information, visit our website at **www.balluff.com/bmf**

TWIN

Series			V-Twin	V-Twin
Size			M8	M12
PNP	NO	Ordering code	BMF00CA	BMF00C9
		Part number	BMF 235K-PS-C-2A-SA95-S75-00,3	BMF 235K-PS-C-2A-SA95-S4-00,3

Other plug and cable variants are available in addition to V-Twin models.
For information, visit our website at **www.balluff.com/bmf**

For other pneumatic cylinder sensors,
please request a copy of our brochure
"BMF magnetic field sensor product overview".

System	**BMF 303**	**BMF 305**	**BMF 103 system**
Dimensions (H×W×L)	4.5×2.9×21.6 mm	10.5×6.5×33.5 mm	16×2.8×4.9 mm
Unique features	**For miniaturized actuators**	**For larger actuators**	**Optimized for short-stroke cylinders and mini-grippers**

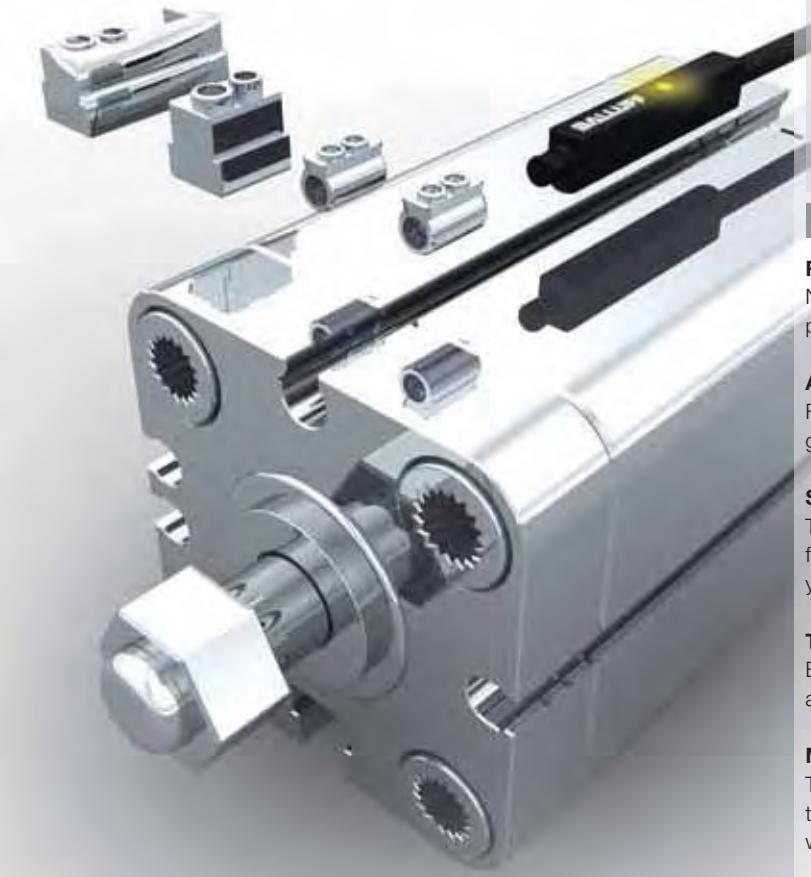
Part number of the most-used types: M8×1 male versions with rotating connection nut and 30 cm cable length

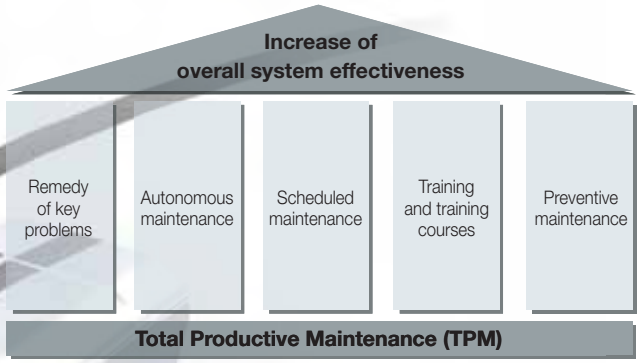
PNP	NO	BMF 303K-PS-C-2A-SA2-S49-00,3	BMF 305K-PS-C-2-SA2-S49-00,3	BMF 103K-PS-C-2A-SA2-S49-00,3

Cylinder profile	Example	Part number					
C-slot (Size 10 slot)	Festo, Sommer Bosch	BMF 303-HW-31 Tough	BMF 303-HW-30 Compact			BMF 103-HW-102 New Hollow screw	BMF 103-HW-42
C-slot (Round slot)	SMC, Bimba, Schunk	BMF 303-HW-97 New Tough	BMF 303-HW-28 Compact			BMF 103-HW-100 New Hollow screw	BMF 103-HW-41
T-slot	General	BMF 303-HW-33 Tough	BMF 303-HW-40 Compact	BMF 305-HW-98 New Hollow screw	BMF 305-HW-20	BMF 103-HW-43	
Round cylinder	General	BMF 303-HW-59 and Hose clamp [1]		BMF 305-HW-24 undo Hose clamp [1]			
Trapezoidal slot	Bosch, Parker, Norgren	BMF 303-HW-101 New		BMF 305-HW-106 New			
Trapezoidal guide	Bosch	BMF 303-HW-80		BMF 305-HW-27			
C-slot Large	Numatics, Norgren	BMF 303-HW-62		BMF 305-HW-32 Ⓐ	BMF 305-HW-92 Ⓑ		
with rail/ SMC slot-A and slot-B	SMC	BMF 303-HW-51 (BMF 303-HW-60 [2])		BMF 305-HW-26 Slot version	BMF 305-HW-99 New Hexagon socket		
Profile cylinder and tie bar 5...11 mm	General	BMF 235-HW-109 and BMF 303-HW-33 New		BMF 235-HW-109 and BMF 305-HW-20 New		BMF 235-HW-109 and BMF 103-HW-43 New	
Profile cylinder and tie bar 9...15 mm	General	BMF 235-HW-110 and BMF 303-HW-33 New		BMF 235-HW-110 and BMF 305-HW-20 New		BMF 235-HW-110 and BMF 103-HW-43 New	
Profile cylinder and tie bar 14...20 mm	General	BMF 235-HW-111 and BMF 303-HW-33 New		BMF 235-HW-111 and BMF 305-HW-20 New		BMF 235-HW-111 and BMF 103-HW-43 New	
U slot	SMC CP95	BMF 303-HW-103 New					

Cylindrical Magnetic Field Sensors with Mounting System

Now even more flexible due to new mounting elements





Removal of key problems
No unreliable switching, even under highest stress, due to highly precise GMR sensor elements and robust metal clamps.

Autonomous maintenance
Faster and safer sensor replacement using one sensor type for all grooves with retaining switching point.

Scheduled maintenance program
The wear-free, fully electronic sensors protect against creeping failure, even after several million switching cycles, thereby increasing your process reliability.

Training and training courses
Easy handling and reduced training effort due to one sensor type for all grooves with uniform operating principle of all mounting brackets.

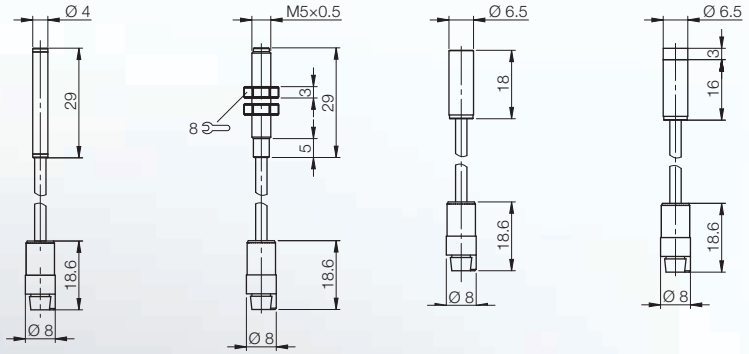
Maintenance prevention
The costs for maintenance are already reduced to a minimum during the design with the consistent use of Balluff magnetic field sensors with mounting bracket concept.

One for all

- By selecting the right mounting bracket you can adapt these sensors to virtually every pneumatic cylinder.
- All-purpose types reduce costs and save storage space.
- BMF 303 system for miniaturized actuators
  BMF 305 system for larger actuators
  BMF 103 system for use on mini-grippers and in short-stroke cylinders.
- SA7 versions for Schunk grippers

Size	Ø 4 mm	M5×0.5	Ø 6.5 mm	Ø 6.5 mm	
Mounting type	Flush	Flush	Flush	Non-flush	
Rated switching distance s_n	**0.1…1 mm**	**0.1…1 mm**	**0.1…1.5 mm**	**0.1…3 mm**	
Ordering code	**BCS0010**	**BCS0011**	**BCS0012**	**BCS0013**	
Part number	BCS G04T4D-XXS10C-EP02-GZ01-002	BCS M05T4C-XXS10C-EP02-GZ01-002	BCS G06T4B-XXS15C-EP02-GZ01-002	BCS G06T4B-XXS30G-EP02-GZ01-002	
Operating voltage U_B	4…8 V DC	4…8 V DC	4…8 V DC	4…8 V DC	
Rated insulation voltage U_i	75 V DC	75 V DC	75 V DC	75 V DC	
Ambient temperature range T_a	–30…+80 °C	–30…+80 °C	–30…+80 °C	–30…+80 °C	
Switching frequency f	100 Hz	100 Hz	100 Hz	100 Hz	
Degree of protection per IEC 60529	IP 67	IP 67	IP 67	IP 67	
Housing material	V2A	V2A	V2A	V2A	
Sensing surface material	PTFE	PTFE	PTFE	PTFE	
Cover material	POM	POM	POM	POM	
Connection	2 m cable PUR, 3×0.14 mm²	2 m cable PUR, 3×0.14 mm²	2 m cable PUR, 3×0.14 mm²	2 m cable PUR, 3×0.14 mm²	

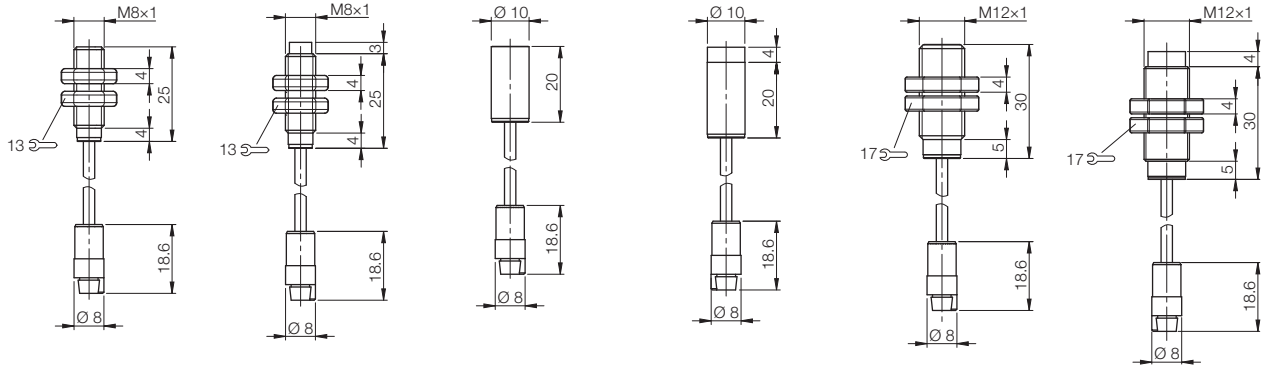
Refer to our catalog or visit **www.balluff.com/BCS** for a large selection of capacitive sensors



mini.S

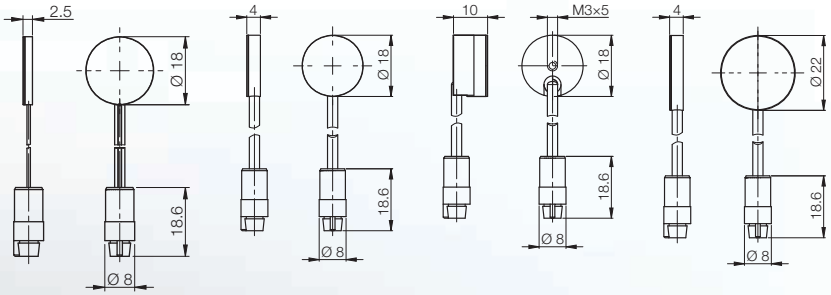
Capacitive Mini Sensors BCS
Object detection in the smallest of spaces

	M8 × 1	**M8 × 1**	**Ø 10 mm**	**Ø 10 mm**	**M12×1**	**M12×1**
	Flush	Non-flush	Flush	Non-flush	Flush	Non-flush
	0.1…1.5 mm	**0.1…3 mm**	**0.1…4 mm**	**1…8 mm**	**0.1…4 mm**	**1…8 mm**
	BCS0014	**BCS0015**	**BCS0016**	**BCS0017**	**BCS0018**	**BCS0019**
	BCS M08T4C-XXS15C-EP02-GZ01-002	BCS M08T4C1-XXS30G-EP02-GZ01-002	BCS G10T4B-XXS40C-EP02-GZ01-002	BCS G10T4C-XXS80G-EP02-GZ01-002	BCS M12T4D-XXS40C-EP02-GZ01-002	BCS M12T4D1-XXS80G-EP02-GZ01-002
	4…8 V DC	4…8 V DC	4…8 V DC	4…8 V DC	4…8 V DC	4…8 V DC
	75 V DC	75 V DC	75 V DC	75 V DC	75 V DC	75 V DC
	–30…+80 °C	–30…+80 °C	–30…+80 °C	–30…+80 °C	–30…+80 °C	–30…+80 °C
	100 Hz	100 Hz	100 Hz	100 Hz	100 Hz	100 Hz
	IP 67	IP 67	IP 67	IP 67	IP 67	IP 67
	V2A	V2A	V2A	V2A	V2A	V2A
	PTFE	PTFE	PTFE	PTFE	PTFE	PTFE
	POM	POM	POM	POM	POM	POM
	2 m cable PUR, 3×0.14 mm²	2 m cable PUR, 3×0.14 mm²	2 m cable PUR, 3×0.14 mm²	2 m cable PUR, 3×0.14 mm²	2 m cable PUR, 3×0.14 mm²	2 m cable PUR, 3×0.14 mm²



Size	Ø 18×2.5 mm	Ø 18×4 mm	Ø 18×10 mm	Ø 22×4 mm	
Mounting type	Flush	Flush	Flush	Flush	
Rated switching distance s_n	**0.1…3 mm**	**1…5 mm**	**1…5 mm**	**1…10 mm**	
Ordering code	**BCS001A**	**BCS001C**	**BCS001E**	**BCS001F**	
Part number	BCS D18T403-XXS30C-EP02-GZ01-002	BCS D18T404-XXS60C-EP02-GZ01-002	BCS D18T407-XXS50C-EP02-GZ01-002	BCS D22T405-XXS10C-EP02-GZ01-002	
Operating voltage U_B	4…8 V DC	4…8 V DC	4…8 V DC	4…8 V DC	
Rated insulation voltage U_i	75 V DC	75 V DC	75 V DC	75 V DC	
Ambient temperature range T_a	–30…+70 °C	–30…+80 °C	–30…+80 °C	–30…+80 °C	
Switching frequency f	100 Hz	100 Hz	100 Hz	100 Hz	
Degree of protection per IEC 60529	IP 66	IP 66	IP 66	IP 66	
Housing material	V2A	V2A	V2A	V2A	
Sensing surface material	PTFE	PTFE	PTFE	PTFE	
Connection	2 m cable PVC, 3×0.09 mm²	2 m cable PUR, 3×0.14 mm²	2 m cable PUR, 3×0.14 mm²	2 m cable PUR, 3×0.14 mm²	

Refer to our catalog or visit **www.balluff.com/BCS** for a large selection of capacitive sensors

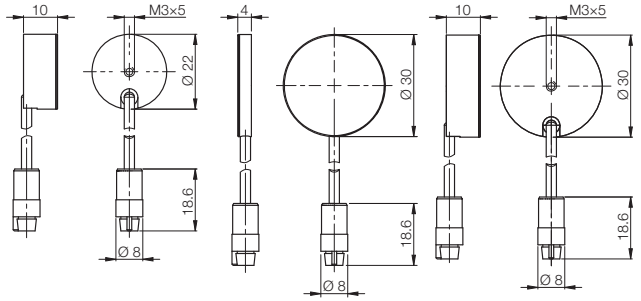


mini.S

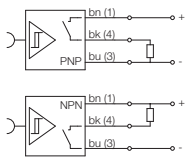
Capacitive Mini Sensors BCS

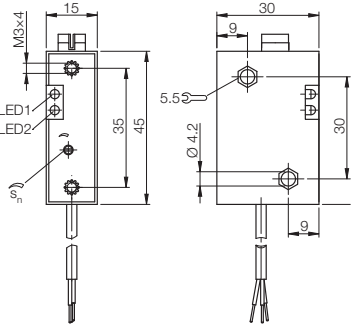
Object detection in the smallest of spaces

	Ø 22×10 mm	Ø 30×4 mm	Ø 30×10 mm
	Flush	Flush	Flush
	1…10 mm	**1…15 mm**	**1…15 mm**
	BCS001H	**BCS001J**	**BCS001K**
	BCS D22T408-XXS10C-EP02-GZ01-002	BCS D30T406-XXS15C-EP02-GZ01-002	BCS D30T409-XXS15C-EP02-GZ01-002
	4…8 V DC	4…8 V DC	4…8 V DC
	75 V DC	75 V DC	75 V DC
	–30…+80 °C	–30…+80 °C	–30…+80 °C
	100 Hz	100 Hz	100 Hz
	IP 66	IP 66	IP 66
	V2A	V2A	V2A
	PTFE	PTFE	PTFE
	2 m cable PUR, 3×0.14 mm²	2 m cable PUR, 3×0.14 mm²	2 m cable PUR, 3×0.14 mm²



Size			45×30×15 mm
PNP	NO	**Ordering code**	**BAE009E**
		Part number	BAE SA-CS-001-PS
PNP	NC	**Ordering code**	**BAE009F**
		Part number	BAE SA-CS-001-PO
NPN	NO	**Ordering code**	**BAE009H**
		Part number	BAE SA-CS-001-NS
NPN	NC	**Ordering code**	**BAE009J**
		Part number	BAE SA-CS-001-NO
Operating voltage U_B			12…35 V DC
Voltage drop U_d at I_e			0.8 V
Rated insulation voltage U_i			75 V DC
Output current max.			300 mA
No-load supply current I_0 max.			20 mA
Reverse polarity/short-circuit protected			Yes/yes
Ambient temperature range T_a			–30…+70 °C
Switching frequency f			100 Hz
Function indicator			Yes/yes
Degree of protection per IEC 60529			IP 67
Housing material			PC
Connection			2 m cable PUR, 3x0.14 mm²





Function overview
LED 1: Switching status indicator
LED 2: Power indicator
Pos. 1: Through-hole Ø 4.2 mm, hexagon on both sides for inserting an M3 nut.

Balluff has expanded its range of ultrasonic sensors to include a sensor in an enclosed stainless steel housing in designs M30×1.5 and Ø 30 mm. The ultrasonic converter is protected by the metal wall to guarantee degree of protection IP 68/ IP 69K for the first time and opens up a wealth of new possibilities even under the harshest ambient conditions. The robust stainless steel sensing surface protects the sensor against aggressive cleaning products such as those used in the packaging and food industry.

- Extremely rugged and reliable
- Large range up to 1.5 m
- High degree of protection IP 68/IP 69K

New: Steelface Ultrasonic Sensors

For the most extreme applications in harsh environments

Coming soon:
Available
Fall 2011

Ultrasonic sensors for object detection

CE

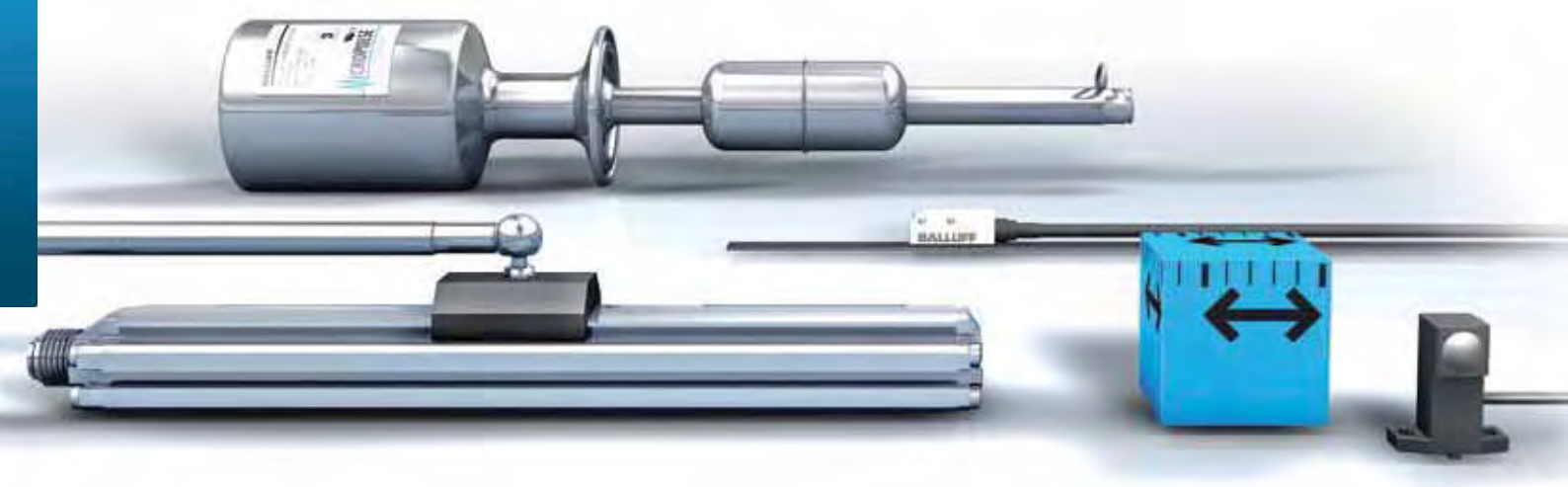
Size			**M30×1.5**	**Ø 30 mm**
Range			150...1500 mm	150...1500 mm
PNP	NO	**Ordering code**	**BUS001R**	**BUS001Y**
	with Teach-in	Part number	BUS M30E0-PSXDR-150-S92G-S	BUS G30E0-PSXDR-150-S92G-S
PNP	NC	**Ordering code**	**BUS001T**	**BUS001Z**
	with Teach-in	Part number	BUS M30E0-POXDR-150-S92G-S	BUS G30E0-POXDR-150-S92G-S
Operating voltage U_B			24 V DC ± 25 %	24 V DC ± 25 %
Ambient temperature range T_a			–15…+80 °C	–15…+80 °C
Switching frequency f			20 Hz	20 Hz
Degree of protection per IEC 60529			IP 68/IP 69K	IP 68/IP 69K
Ultrasonic frequency, dispersion cone angle			220 kHz, 8°	220 kHz, 8°
Resolution			1 mm	1 mm
Housing/sensing surface material			Stainless steel 1.4571	Stainless steel 1.4571
Connection			M12 connector	M12 connector

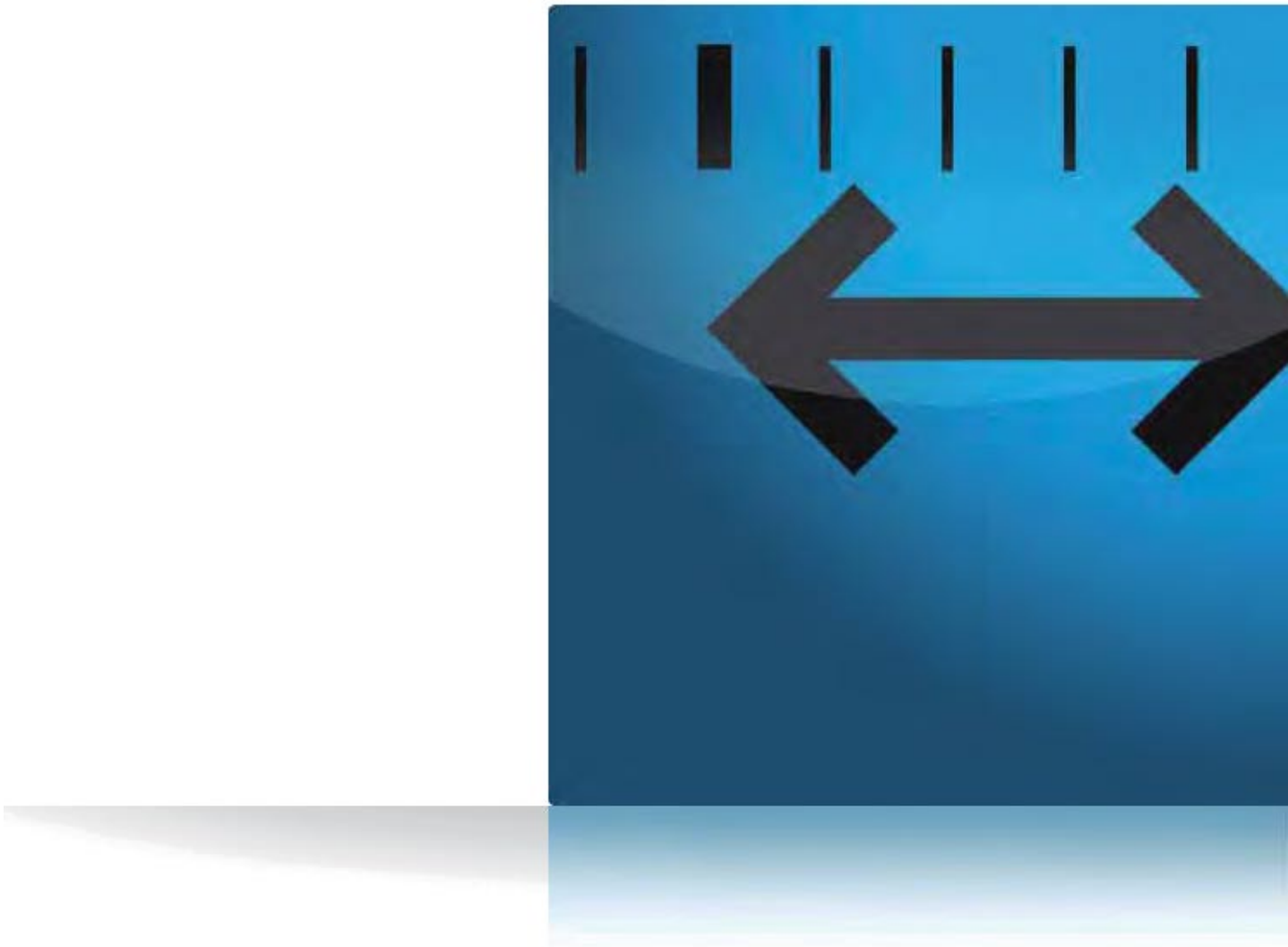
Ultrasonic sensors for analog distance measurement

Size			**M30×1.5**	**Ø 30 mm**
Measuring range			150...1500 mm	150...1500 mm
Analog output		**Ordering code**	**BUS001N**	**BUS001U**
0...10 V DC		Part number	BUS M30E0-XADX-150-S92G-S	BUS G30E0-XADX-150-S92G-S
Analog output		**Ordering code**	**BUS001P**	**BUS001W**
4...20 mA		Part number	BUS M30E0-XBDX-150-S92G-S	BUS G30E0-XBDX-150-S92G-S
Operating voltage U_B			24 V DC ± 25 %	24 V DC ± 25 %
Ambient temperature range T_a			–15…+80 °C	–15…+80 °C
Degree of protection per IEC 60529			IP 68/IP 69K	IP 68/IP 69K
Ultrasonic frequency/dispersion cone angle			220 kHz, 8°	220 kHz, 8°
Resolution			1 mm	1 mm
Output curve deviation max.			0.5 %	0.5 %
Characteristic slope			7.4 mV/mm	11.8 µA/mm
Housing/sensing surface material			Stainless steel 1.4571	Stainless steel 1.4571
Connection			M12 connector	M12 connector

linear
position sensing

inductive positioning system
magnetic linear encoder systems
micropulse transducers

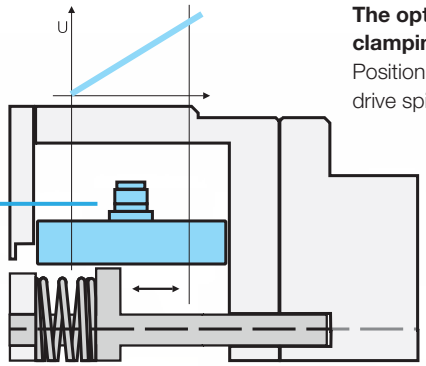




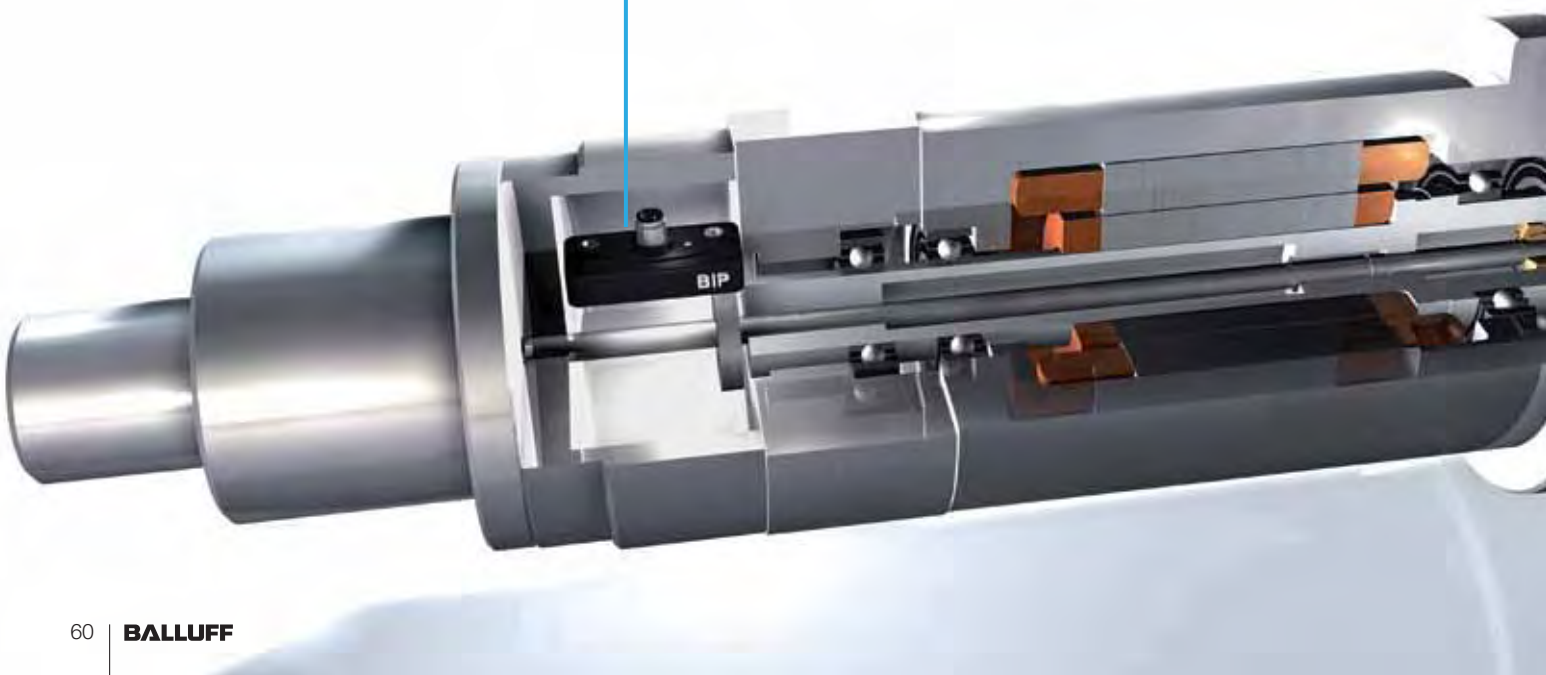
- Absolute measuring principle, several measuring ranges, teachable
- High level of repeat accuracy and precision
- Optimal linearity and low temperature drift
- Optimized housing design for clamping distance monitoring
- Distance-proportional IO-Link output signal
- Standard output 0...10 V, 4...20 mA

The inductive positioning system BIP is the accurate measuring system for the position detection of metallic objects.

Applications
The main application area of the BIP is the linear position monitoring of drive spindles and clamping devices for tools and workpieces.

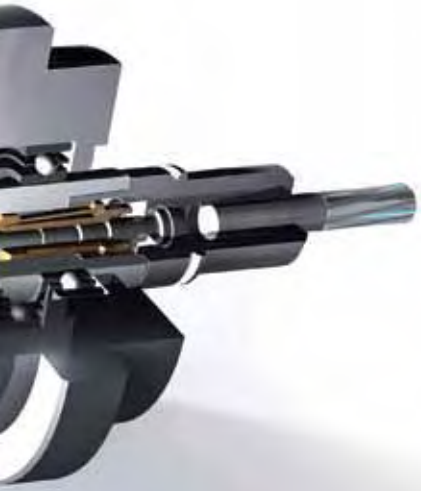


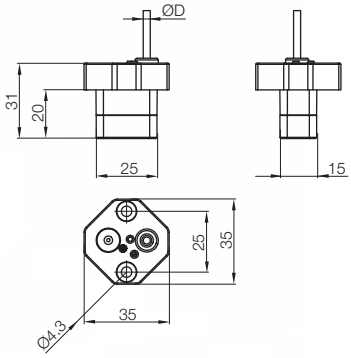
The optimal sensor for clamping distance monitoring
Position sensor BIP in use at a drive spindle for tools.

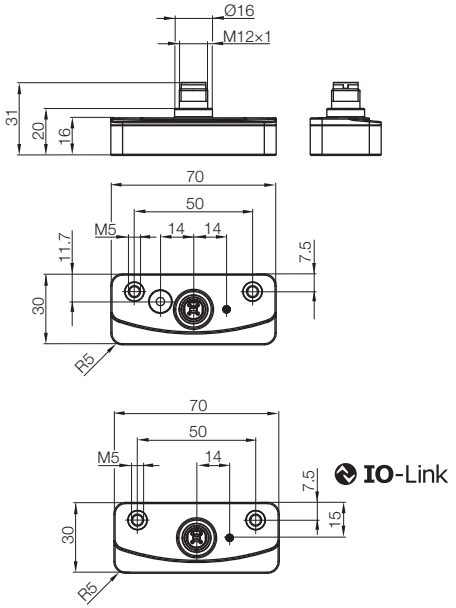


CE
IO-Link

Ordering code	BIP0001	BIP0002	BIP0004	BIP0005
Part number	BIP AD0-B014-01-EP02	BIP AD2-B040-02-S4	BIP LD2-T040-02-S4	BIP CD2-B040-02-S4
Output signal	0...10 V	0...10 V	IO-Link	4...20 mA
Length of measuring range is teachable	7...14 mm	20...40 mm		
Detection range	0 - 14 mm	0...40 mm		
Target width (EC80)	8 mm	14 mm		
Target distance	0.5...2 mm	1...3 mm		
Resolution	14 µm	40 µm		
Repeat accuracy	±80 µm	±80 µm		
Non-linearity	±250 µm	±400 µm		
Ambient temperature range	–25...+70°C	–25...+85°C		
Connection	2 m cable	M12 connector		
Supply voltage	15...30 V	15...30 V (IO-Link 18...30 V)		
Housing material	PA	PA		
Function indicator LED	Yes	Yes		

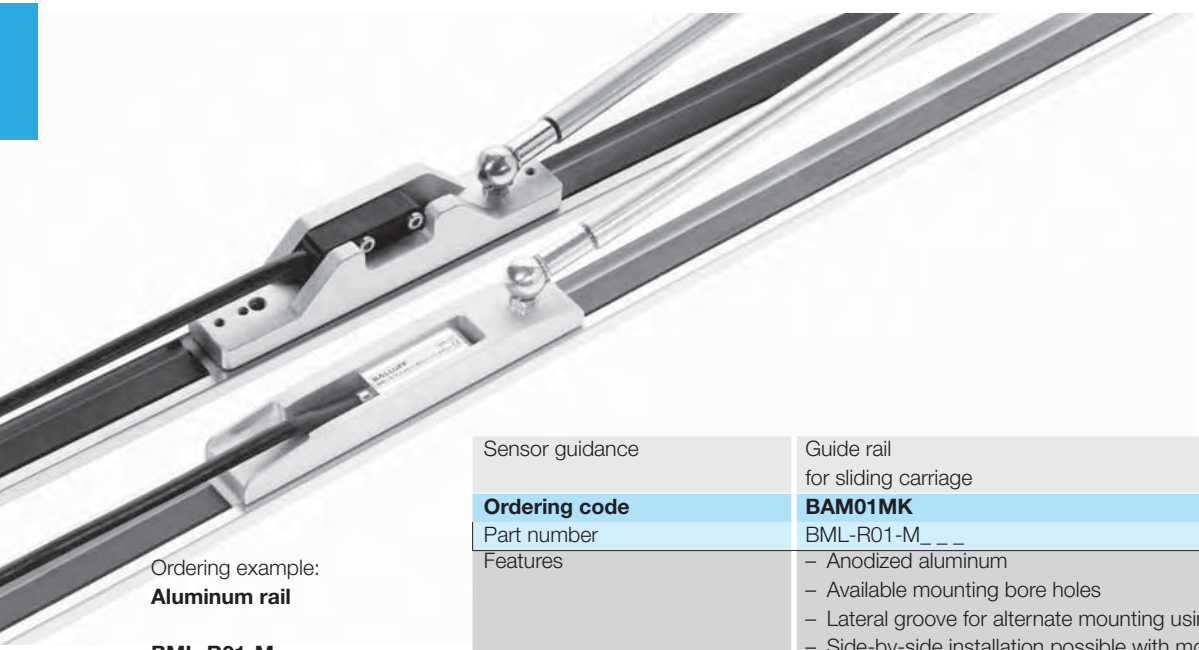






- Easy integration, even in existing systems
- Minimum space requirements
- Robust and lubricant-free design
- Standard connection via control arm
- Random side-by-side mounting

Applications
The guided BML can be used wherever long paths have to be measured, but without any precise guidance by the machine. Examples: sheet metal presses, elevators, cutting installations, material handling technology.



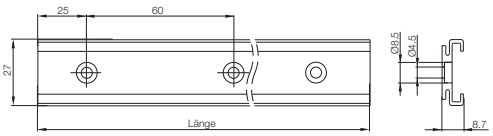
Sensor guidance	Guide rail for sliding carriage
Ordering code	**BAM01MK**
Part number	BML-R01-M_ _ _
Features	– Anodized aluminum – Available mounting bore holes – Lateral groove for alternate mounting using claws – Side-by-side installation possible with mounting claws – Maintenance-free dry operation – Lubricant-free – Suitable for all linear tapes
Version	for holding the sliding carriage BML-C01 or BML-C02

Ordering example:
Aluminum rail

BML-R01-M_ _ _

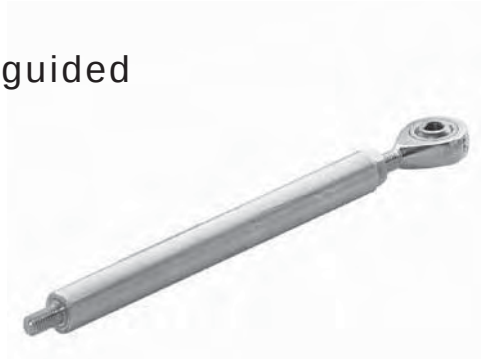
Length in cm,
max. 300

Information about our magnetic linear encoder systems can be found in our new catalog or online at **www.balluff.com/bml**

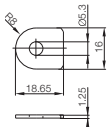


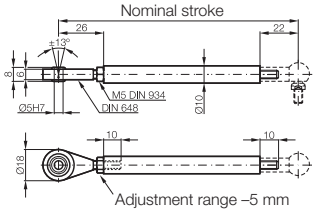
Magnetic Linear Encoder System BML, guided

The solution for many applications

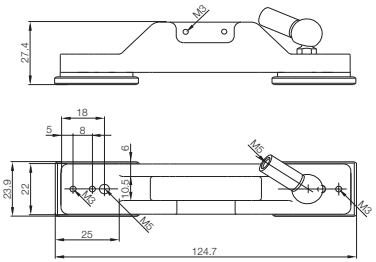


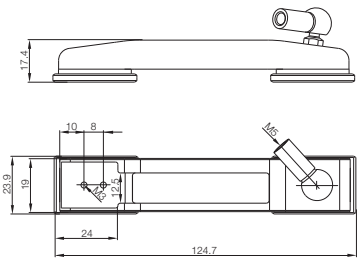
Accessories	Mounting guide	Claws (2 units)	Control arm
Ordering code	**BAM01L9**	**BAM01JL**	**BAM00Z6**
Part number	BML-Z0010	BML-Z0008	BTL2-GS10-_ _ _ _-A
Version	for precise installation of the magnetic tape	for lateral mounting of the rail and at transition points	for connecting the sliding carriage to the machine





	Sliding carriage for sensors BML-S2B, BML-S2E, BML-S1C	Sliding carriage for sensors BML-S1F
	BAM01MF	**BAM01MH**
	BML-C01	BML-C02
	– Aluminum – Completely installed with gliders and connection for control arm – Prepared connection for drag chains – Maintenance-free dry operation – Lubricant-free	
	for holding the sensors BML-S2B, BML-S1C or BML-S2E	for holding the sensor BML-S1F





Positioning extremely heavy bridge sections accurate to the millimeter

Bridge sections are usually assembled on land to minimize the obstruction of shipping traffic on rivers. After assembly, the sections are lowered horizontally onto floating pontoons in the river, moved into place, raised to the future road level and secured in position. Special heavy-duty hydraulic cylinders with integrated micropulse displacement systems guide the horizontal feed and vertical lifting movements. The integrated micropulse displacement systems ensure that the heavy bridge sections are positioned synchronously and accurate to the millimeter.

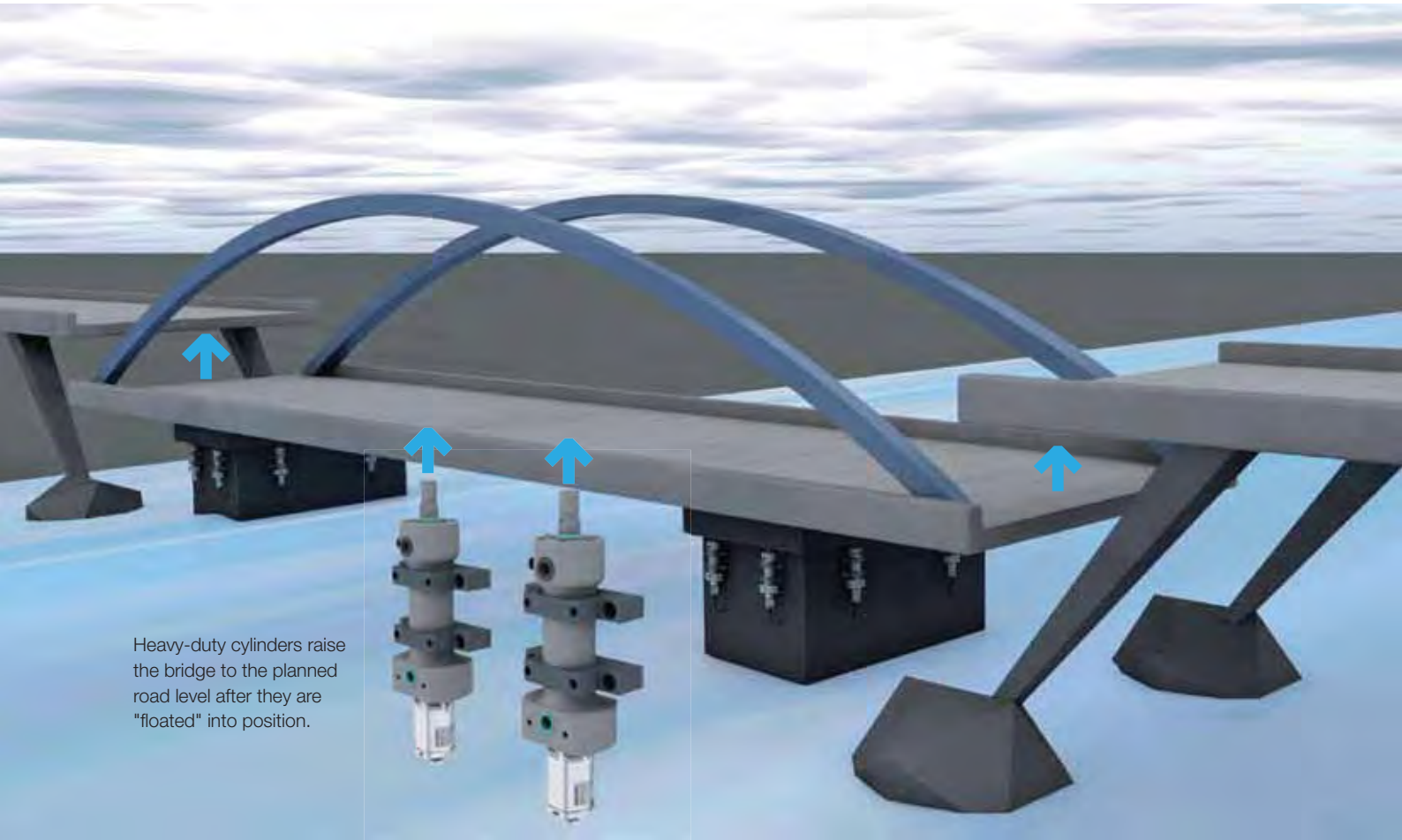
Applications

Structural design and calculations

- Active support of walls
- Bridge positioning and lifting technology
- Leveling structures
- Off-shore sector
- Tunnel construction

Industry applications

- Pumps and compressors
- Lift and lifting technology
- Forging presses
- High-pressure hydraulics



Heavy-duty cylinders raise the bridge to the planned road level after they are "floated" into position.

Micropulse Transducers BTL5-CD

High-pressure transducers resistant to 1000 bar make it easy for the heavy-duty cylinders

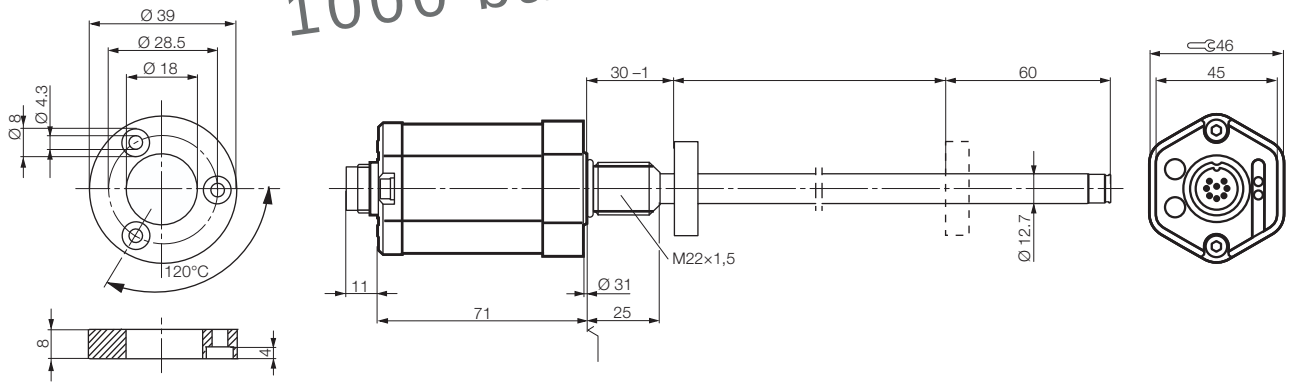
Micropulse CD transducers ensure that extreme loads are moved steadily and with precision. They are based on the established magnetostrictive distance measurement technology. The absolute, contact-free principle is suitable for the reliable, high-precision and dynamic measurement of piston positions on hydraulic cylinders. The special flange and protective pressure tube design as well as the extremely robust stainless steel material make the micropulse CD transducers ideal for installation as a feedback system in high-pressure and heavy-duty cylinders.

Features

- For pressures up to 1000 bar
- Measuring lengths 25...2000 mm
- Resolution down to 1 µm
- Degree of protection IP67/68
- Temperature range –40...+85 °C
- Plug or cable variants
- Multi-magnet technology

BTL5-CD variants	
Part number	**Analog output signal**
BTL7-E/C...-CD-...	Current
BTL7-A/G...-CD-...	Voltage
	Digital interface
BTL5-P/M...-CD-...	P pulse interface
BTL7-S...-CD-...	SSI
	Fieldbuses
BTL5-T...-CD-...	PROFIBUS
BTL5-H...-CD-...	CANopen
	Accessories
BTL-P-1018-3R	Encoder ring

1000 bar

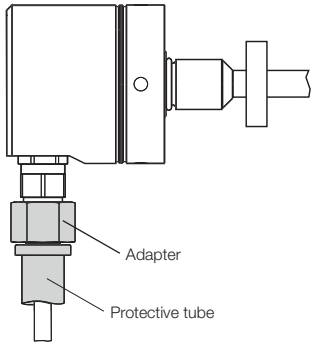


Micropulse ProCompact with cable protection system
Extreme ambient conditions, in which high reliability together with accuracy is required, are typical application areas for Micropulse ProCompact transducers.

The non-contact operating principle ensures a complete absence of wear and nearly endless service life. The high-precision output signal serves as an absolute signal for the controller in a wide range of interfaces.

Areas of application
- Locks and floodgates
- Run-of-river plants
- Large hydraulically powered valves
- Monitoring reflection channels on thermosolar power stations
- Sand dredgers
- Track systems
- Logging machines
- Hydroelectric power plants
- Construction equipment
- Combines

Series	BTL5 Pro Compact HB/WB rod
Part number/output signal	BTL5-A11-M...-HB/WB-...-C/analog 0 - 10 V
Part number/output signal	BTL5-E1-M...-HB/WB-...-C/analog 4 - 20 mA
Part number/output signal	BTL5-C1-M...-HB/WB-...-C/analog 0 - 20 mA
Part number/output signal	BTL5-G11-M...-HB/WB-...-C/analog –10 - 10 V
Part number/output signal	BTL5-P1-M...-HB/WB-...-C/digital pulse
Part number/output signal	BTL5-S1-M...-HB/WB-...-C/digital SSI
Part number/output signal	BTL5-H1-M...-HB/WB-...-C/BUS CANopen
Shock rating	100 g/6 ms as per IEC 60068-2-27 100 g/2 ms as per IEC 60068-2-29
Vibration	12 g, 10...2000 Hz as per IEC 60068-2-6
Degree of protection per IEC 60529	IP 68 (5 bar with cable); IP 69K (with cable protection system); IP 68 (40 bar with cable protection system BAM AD/PT)
Housing material	Stainless steel 1.4404
Flange and tube material	Stainless steel tube 1.4571, flange 1.4404
Operating temperature	–40...+85 °C
Storage temperature range	–40...+100 °C
Cable connection type	PTFE/–40 - +200 °C
Standard nominal lengths [mm]	0025 5080 or in 1-mm increments on request.



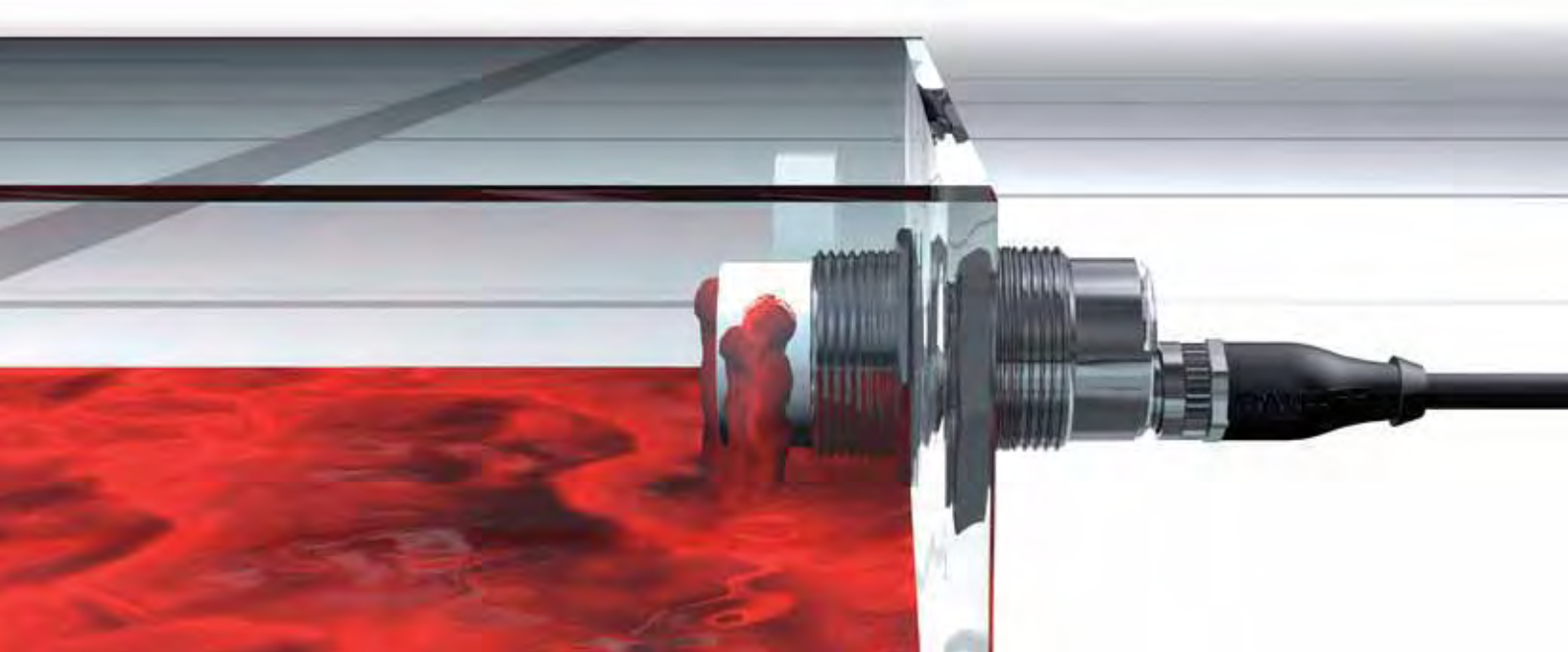
Series	Adapter
Ordering code	**BAM01JW**
Part number	BAM AD-XA-007-M18×1.5/D12-2
Housing material	Brass (not seawater-resistant)
Ordering code	**BAM01JY**
Part number	BAM AD-XA-007-M18×1.5/D12-4
Housing material	Stainless steel V2A (conditionally seawater-resistant)
Model	**Protective tube**
Part number	BAM PT-XA-001-095-0-_ _ _
Tube length	02, 05, 10, 15, 20, 30, 50 and 100 m
Degree of protection	IP 68 (40 bar) IP 69K (when installed and attached)
Housing material	PUR (resistant to seawater, weld splatter and UV radiation)
Outside diameter	16 mm
Inside diameter	9,5 mm
Temperature range	–40...+95°C
Min. bending radius (static)	51 mm

fluid sensors

capacitive sensors for level detection
micropulse filling level sensor

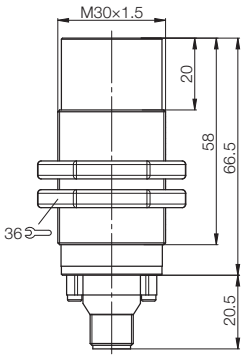
- Detecting high-conductive acids, such as sulphuric or hydrochloric acid, through plastic or glass containers that are up to 20 mm thick
- Reliable detection of fill levels in food items, such as ketchup or mustard, despite heavy buildup
- Detecting concentrated cleaning agents in plastic containers

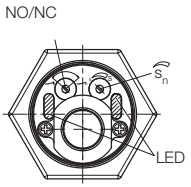
Industrial wastewater (depending on conductivity of the medium)		
Disinfectants (media containing chlorine)		
Table salt solution		
Rinsing agents		
Milk/buttermilk/yogurt		
Fruit juice		
Coolant/lubricants		Ketchup/mayonnaise/mustard
Formic acid (30 %)		Phosphoric acid (10 %)
Vinegar		Sulfuric acid (10 %)
Cola		Calcium chloride (30 %)
Honey/glue	Blood	Hydrochloric acid (40 %)
Beer	Saltwater	Nitric acid (12 %)
SMARTLEVEL 15 approx. 0.7 - 15 mS	SMARTLEVEL 50 approx. 15 - 50 mS	SMARTLEVEL 500+ approx. 50 - 500 mS and greater



Capacitive Sensor SMARTLEVEL 500+
Progress in smart level technology

SMARTLEVEL 500+





Size		**M30×1.5**
Mounting type		Non-flush
PNP/NPN and	**Ordering code**	**BCS00HJ**
NO/NC user selectable	Part number	BCS M30T4M3-GPCFVG-S04G
Operating voltage U_B		10…30 V DC
Voltage drop U_d at I_e		≥ 2 V
Rated insulation voltage U_i		75 V DC
Output current max.		100 mA
No-load supply current I_0 max.		< 15 mA
Reverse polarity/short-circuit protected		Yes/yes
Ambient temperature range T_a		–10…+60 °C
Switching frequency f		5 Hz
Power indicator		Green LED
Function ready/error indicator		Yellow LED
Degree of protection per IEC 60529		IP 64, connection side IP 67
Material	Housing	V2A
	Sensing surface	PTFE (Teflon)
	Cover	PBT/PE
Connection		M12 connector, A-coded

SMARTLEVEL 500+

- Continuously precise measurement in µ range delivers excellent filling results
- 100 % stainless steel ensures top hygiene standards and long service life
- International certificate guarantees maximum quality

Maximum precision for food hygiene – internationally certified

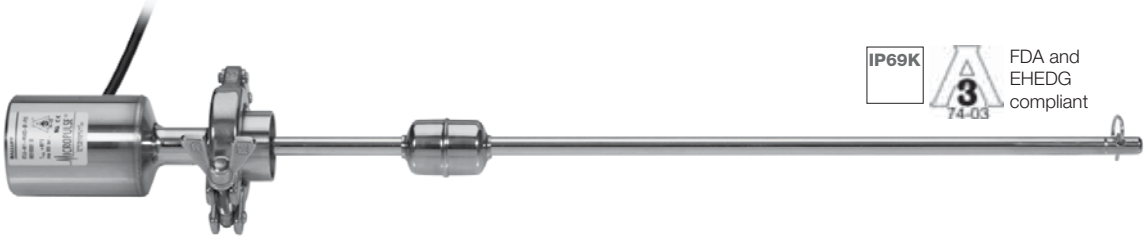
The BTL-SF filling level sensor ensures continuously precise measurement in applications that demand extreme hygiene. Made from corrosion-free stainless steel with excellent surface quality and rounded edges, the sensor meets the highest international hygiene standards and fulfills all strict requirements of the food industry. Take advantage of the best quality directly from the manufacturer.

Other benefits

- Neutral for all liquids
- Compensates for foam to deliver reliable filling level values
- Adjustment-free installation
- Easy to clean in installed state (CIP – Clean in Place)
- For process temperatures up to 130 °C (SIP – Sterilization in Place)
- Standardized interfaces ensure flexible installation
- Internationally certified quality guarantees global marketing and sales of your system
- Rising and falling signal available

Micropulse BTL-SF Filling Level Sensor

Maximum precision for foodstuffs and hygiene

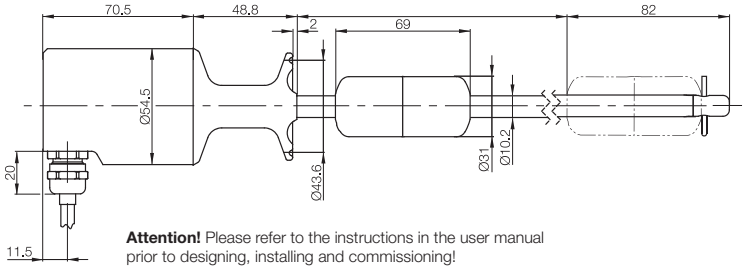


IP69K

3 A 74-03

FDA and EHEDG compliant

Model	BTL5 rod SF
Interface transducer	analog
Interface - customer device	analog
Ordering code	**BTL5-...-M_ _ _ _-SF-F_ _**
Reverse polarity protected	Yes
Overvoltage protected	36 V
Dielectric constant	500 V (GND to housing)
Degree of protection per IEC 60529	IP 67/IP 69K (flange and tube)
Housing material	Stainless steel 1.4404
Flange and tube material	1.4404
Connection	Cable connection
Mounting	1.5" Tri Clamp as per SSI 3A standard 74-03
Pressure rating	300 bar (depending on float)
Standard nominal stroke (mm)	0025, 0050, 0075, 0100, 0125, 0150, 0175, 0200, 0225, 0250, 0275, 0300, 0325, 0350, 0375, 0400, 0425, 0450, 0475, 0500, 0550, 0600, 0650, 0700, 0750, 0800, 0850, 0900, 0950, 1000, 1100, 1200, 1300, 1400, 1500, 1600, 1700, 1800, 1900, 2000, 2250, 2500 or in 5 mm increments on request



Attention! Please refer to the instructions in the user manual prior to designing, installing and commissioning!

Refer to our micropulse transducer brochures and catalogs or visit **www.balluff.com** for more detailed information

industrial identification

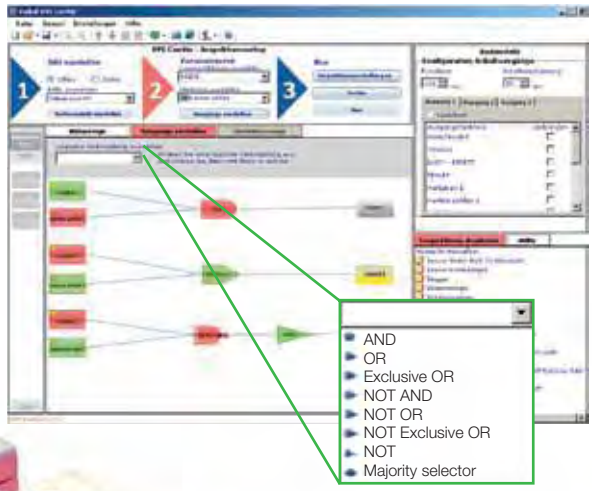
vision sensors
industrial RFID systems

SHARPSHOOTER®

In addition to the standard functions of the BVS-E, the advanced Sharpshooter vision sensor also monitors the rotational position. It can detect objects regardless of the location and position. Production can be monitored more efficiently through shorter process times and the option of using logical functions to combine individual checks.

- 360° position tracking
- Faster processor reduces process times
- Features linked by logical functions
- Extensive range of accessories
- Function module for PLC available

Logical connections



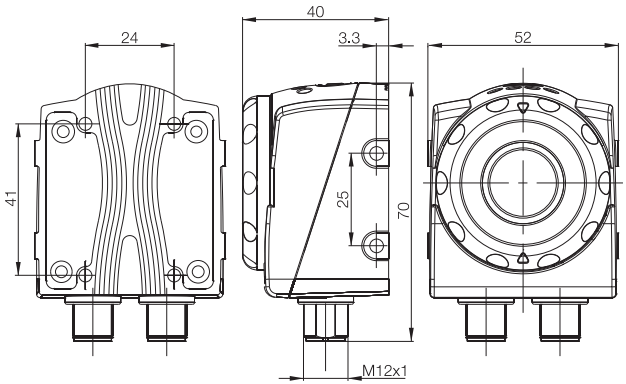
Sharpshooter BVS-E Advanced

360° detection for optimized process control

Series		**BVS-E Advanced**	**BVS-E Advanced**	**BVS-E Advanced**
Lens, focal length		Wide-angle lens, 6 mm	Standard lens, 8 mm	Telephoto lens, 12 mm
PNP	**Ordering code**	**BVS000L**	**BVS000J**	**BVS000K**
	Part number	BVS OI-3-055-E	BVS OI-3-051-E	BVS OI-3-053-E
NPN	**Ordering code**	**BVS000R**	**BVS000P**	**BVS000N**
	Part number	BVS OI-3-056-E	BVS OI-3-052-E	BVS OI-3-054-E
Supply voltage U_S		24 V DC ±10 %	24 V DC ±10 %	24 V DC ±10 %
Switching inputs		1× Trigger, 1× Select	1× Trigger, 1× Select	1× Trigger, 1× Select
Switching outputs		1× lighting synchron. or PNP, 3× PNP or NPN configurable	1× lighting synchron. or PNP, 3× PNP or NPN configurable	1× lighting synchron. or PNP, 3× PNP or NPN configurable
Configuration interface		Ethernet 10/100 Base T	Ethernet 10/100 Base T	Ethernet 10/100 Base T
Typ. detection rate		3...50 Hz (depending on evaluation function)	3...50 Hz (depending on evaluation function)	3...50 Hz (depending on evaluation function)
Working range		50...1000 mm	50...1000 mm	50...1000 mm
Working distance, Field of view (horizontal×vertical)		50 mm, 42×30 mm / 1000 mm, 640×480 mm	50 mm, 25×20 mm / 1000 mm, 460×380 mm	50 mm, 17×12 mm / 1000 mm, 320×210 mm
Lighting		LED, incident light (red), deselectable	LED, incident light (red), deselectable	LED, incident light (red), deselectable
Eye safety acc. to IEC 62471		Extempt group	Extempt group	Extempt group
Connection		2 connectors M12 (8- and 4-pin)	2 connectors M12 (8- and 4-pin)	2 connectors M12 (8- and 4-pin)
Degree of protection as per IEC 60529		IP 54	IP 54	IP 54

To define the field of view and working distance, use the distance calculator at:
www.balluff.com/sharpshooter

BVS-M Monitor	
Ordering Code	**BAE00EH**



SHARPSHOOTER®

Check the marking on your products. Regardless of whether you label them with 1D codes (barcodes) or 2D codes (Data Matrix codes), the Sharpshooter reads all common codes on the market. Text and sequences of numbers such as code plain text can be verified using OCV. The result: “Inspection OK” or “Inspection not OK”.
If you need to view the read code data to find out which parts are being processed, you can output it via the RS232 or Ethernet interface.

- Simple operation
- Read several codes in an inspection simultaneously
- Output code data via RS232 or Ethernet interface
- Verify character strings
- Change between inspections via PLC
- 360° position detection
- Extensive range of accessories
- Function module for PLC available

Readable barcodes
- Interleaved 2-of-5
- Code 39
- Code 128
- Pharmacode
- Codabar
- EAN 8
- EAN 13
- UPC-E
- Postnet
- IMB

Readable Data Matrix codes
- ECC 200

Sharpshooter BVS-E Identification

Detecting and identifying varied codes

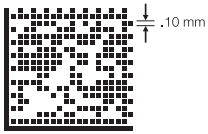
Series	BVS-E Identification	BVS-E Identification	BVS-E Identification
Lens, focal length	Standard lens, 8 mm	Telephoto lens, 12 mm	Telephoto lens, 16 mm
PNP **Ordering code**	**BVS0001**	**BVS000T**	**BVS000Y**
Part number	BVS ID-3-001-E	BVS ID-3-003-E	BVS ID-3-007-E
Supply voltage U_S	24 V DC ±10 %	24 V DC ±10 %	24 V DC ±10 %
Switching inputs	1× Trigger, 1× Select	1× Trigger, 1× Select	1× Trigger, 1× Select
Switching outputs	1× lighting synchron., 1× PNP	1× lighting synchron., 1× PNP	1× lighting synchron., 1× PNP
Interface	RS232	RS232	RS232
Configuration interface	Ethernet 10/100 Base T	Ethernet 10/100 Base T	Ethernet 10/100 Base T
Typ. detection rate	3...15 Hz (depending on evaluation function)	3...15 Hz (depending on evaluation function)	3...15 Hz (depending on evaluation function)
Working range	50...1000 mm	50...1000 mm	150...1000 mm
Working distance, Field of view (horizontal×vertical)	50 mm, 25×20 mm / 1000 mm, 460×380 mm	50 mm, 17×12 mm / 1000 mm, 320×210 mm	150 mm, 34×26 mm / 1000 mm, 229×172 mm
Lighting	LED, incident light (red), deselectable	LED, incident light (red), deselectable	LED, incident light (red), deselectable
Eye safety acc. to IEC 62471	Extempt group	Extempt group	Extempt group
Connection	2 connectors M12 (8- and 4-pin)	2 connectors M12 (8- and 4-pin)	2 connectors M12 (8- and 4-pin)
Degree of protection as per IEC 60529	IP 54	IP 54	P 54

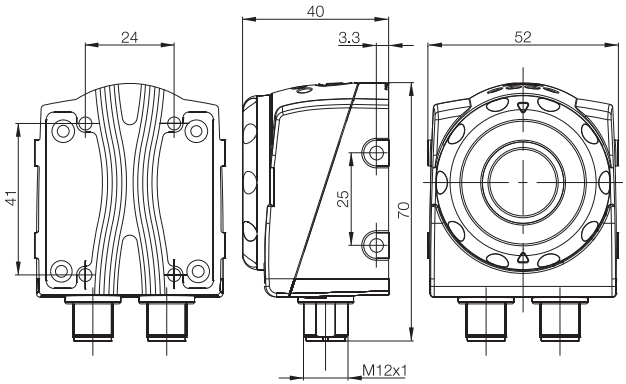
To define the field of view and working distance, use the distance calculator at:
www.balluff.com/sharpshooter

Minimum code module resolution with 12 mm lens at 50 mm

Linear Bar Code

2D Data Matrix Code



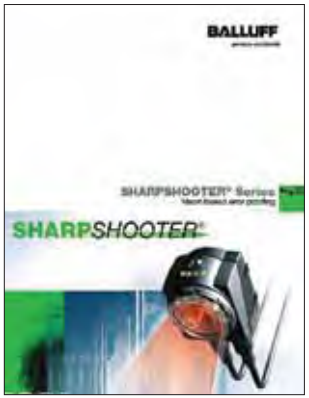


BVS-M Monitor	
Ordering Code	**BAE00EH**

SHARPSHOOTER®

Lights used in an industrial environment depend on maximum reliability, outstanding quality and a good price/performance ratio. Balluff offers different versions of light to suit your needs. Select the best solution for your task and profit from our mature technology.

We offer different versions:
- Ring lights
- Line lights
- Background lighting
- Spotlights
- Dark field illumination



See the Sharpshooter Sensor brochure for a large selection of lights. For additional information, visit our website at **www.balluff.com/sharpshooter**

Ring lights

- Compatible mounting bracket for sensor and light
- Shadow free illumination with a high degree of brightness
- For inspections with a large working distance

Line lights

- Homogeneous, directed light
- Generate shadows to check features
- Available with red, infrared and white light

Background lights

- Simple monitoring of dimensions and shapes
- Independent of material and surface type
- Various light field sizes available

Spotlights

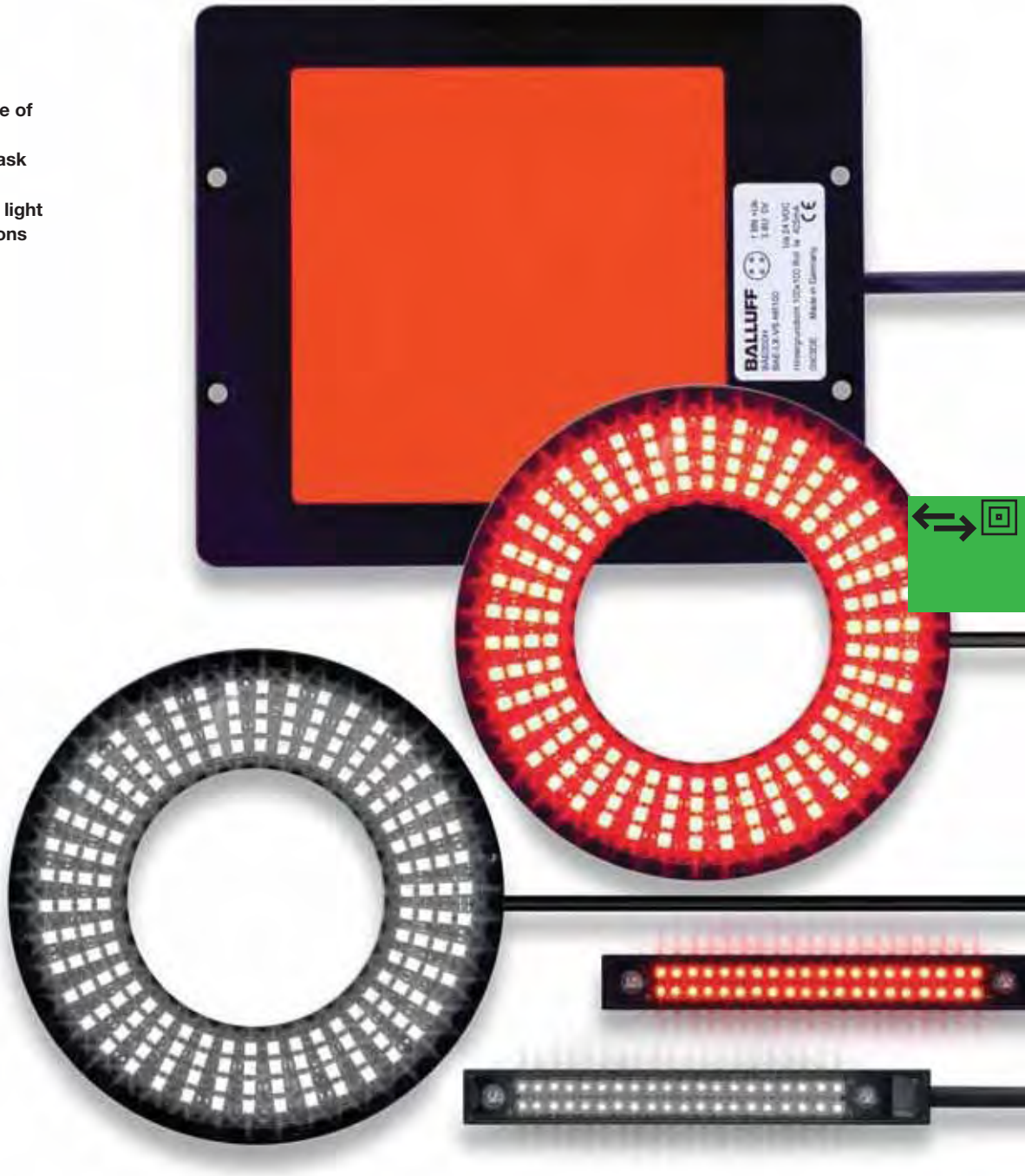
- Accurate illumination
- Implement larger inspection distances
- Available with red and white light

Dark field illumination

- Monitors scratches and dents in surfaces
- Independent of material and surface type
- Various light field sizes available

Accessories for Vision Sensors BVS
Optimizing illumination – Process reliability

Balluff offers a wide range of additional lights because each image processing task depends entirely on the illumination. Only perfect light can provide ideal conditions for your inspection.



Why RFID from Balluff?

Comprehensive system expertise – many years of experience

Modern production technologies with smaller batch sizes and ever shorter production cycle times require unambiguous recognition and matching of the produced parts.

In response to this type of production, greater flexibility is provided by industrial RFID, identification systems with read-only and read/write capability for ensuring the most current data in every single process segment. Balluff Industrial RFID BIS reliably carry large quantities of data without the need for visual contact.

Unlimited read/write cycles ensure flexible, rapid, contact-free communication even for the transfer of large data quantities in highly dynamic applications. Our wear-free BIS are easy to integrate in all types of controllers.

Economical Balluff identification systems are able to manage the volumes of information required in modern-day production plants and make sure your data is transferred to the right place at the right time. All the relevant production and quality data can be acquired and recalled at any time: for optimized production processes and maximum production reliability. Profit from the advantages of Balluff Industrial RFID and benefit from more than 25 years of Balluff RFID expertise. Simply select from the product range according to your application requirements.

Benefits

- **Quick, flexible non-contact data communication without visual contact**
- **Industrial strength in any environment**
- **High-performance, cost-effective**

See our Industrial Identification catalog for a large selection of products. For additional information, visit **www.balluff.com/rfid**

ALPHA EtherNet/IP DeviceNet IO-Link

Protecting Products and Know-how
Balluff is there

Product piracy is a significant threat to the innovation force and competitiveness of the capital goods industry. According to a VDMA survey from 2008, product piracy already affects two-thirds of the more than 3000 member companies. Today, aggregates, modules up to complete machines are being copied. This is reason enough for Balluff to actively participate in the "Product and know-how protection" working group of the VDMA.

For companies, the product piracy leads to a violation of patent and brand rights and to the loss of their good image. This is frequently accompanied by an enormous price pressure on the original. At the end of the day, it not only costs companies a lot of money, but it also threatens jobs.

Only a holistic approach that includes the areas technology, product, information, process and rights, can lead to a solution. Especially with respect to technologies and products, industrial RFID components from Balluff can be an important tool in identifying the original and tracking its further path.

- Recognizing piracy
- Securing quality
- Protecting your know-how

Applications
The use of RFID allows storing data directly at the object. This allows not only identifying counterfeit copies, but also automating setup routines and increasing machine availability. By identifying security and quality-relevant parts, RFID supports you in securing your quality and ensuring security within the process. We gladly show you those options that are relevant to you – contact us!

technicalsupport@balluff.com

- Distances up to 130 mm offer greater flexibility, regardless of the background surface
- FRAM data carriers ensure virtually unlimited read/write cycles.
- Conformity applicable worldwide as per ISO 15693.
- Status indicators mounted directly on the antenna housing are a valuable feature.
- The robust housing guarantees reliable operation in harsh environments.
- 100% RFID quality means greater reliability.

Application areas
The advantages of the HF antenna BIS M-350 become immediately obvious in all applications where the data carrier is mounted directly on metal or the material in the immediate vicinity cannot be predetermined accurately, for example when products are transported in a crate. BIS M sensors simply ignore the different materials, which means that water, oil, dust and metal have absolutely no effect on the high-performance data carriers.

A Powerful High-Frequency Package Ensures Maximum Reliability
HF antenna BIS M-340 and BIS M-350

One of the challenges of intralogistics is the transportation of constantly changing materials. However, smooth operation and transparent processes are still required in spite of the wide variety of different products. A requirement that is not always easy for RFID systems because metallic surfaces, fluids and dirt really put these systems to the test. Not the HF antenna BIS M-350, however. The antenna is fitted with optimized data carriers that help overcome difficulties of this kind with ease while reliably ensuring maximum transparency. All data can be traced at any time.

The following system variants are available:

- BIS M 350 (rod antenna)
- BIS M 340 (circular antenna)
- Compatible data carriers: BIS M-150 and BIS M-151 for BIS M-350 and BIS M-107 for BIS M-340

Ordering code	BIS00LZ	BIS00N6
Part number	BIS M-350-001-S115	BIS M-340-001-S115
Dimensions	240×120×60 mm	240×120×60 mm
Installation type (steel)	with clear zone	with clear zone
Antenna type	**rod**	**rectangular**
Degree of protection per IEC 60529	IP 65	IP 65
Ambient temperature range T_a	0...+55 °C	0...+55 °C
Housing material	PC	PC

Long range data bolts

- High degree of protection – where it is needed
- Data carrier in screw form – simplest form of installation
- Large distances – for more flexibility in your application
- ISO 15693 – applicable worldwide

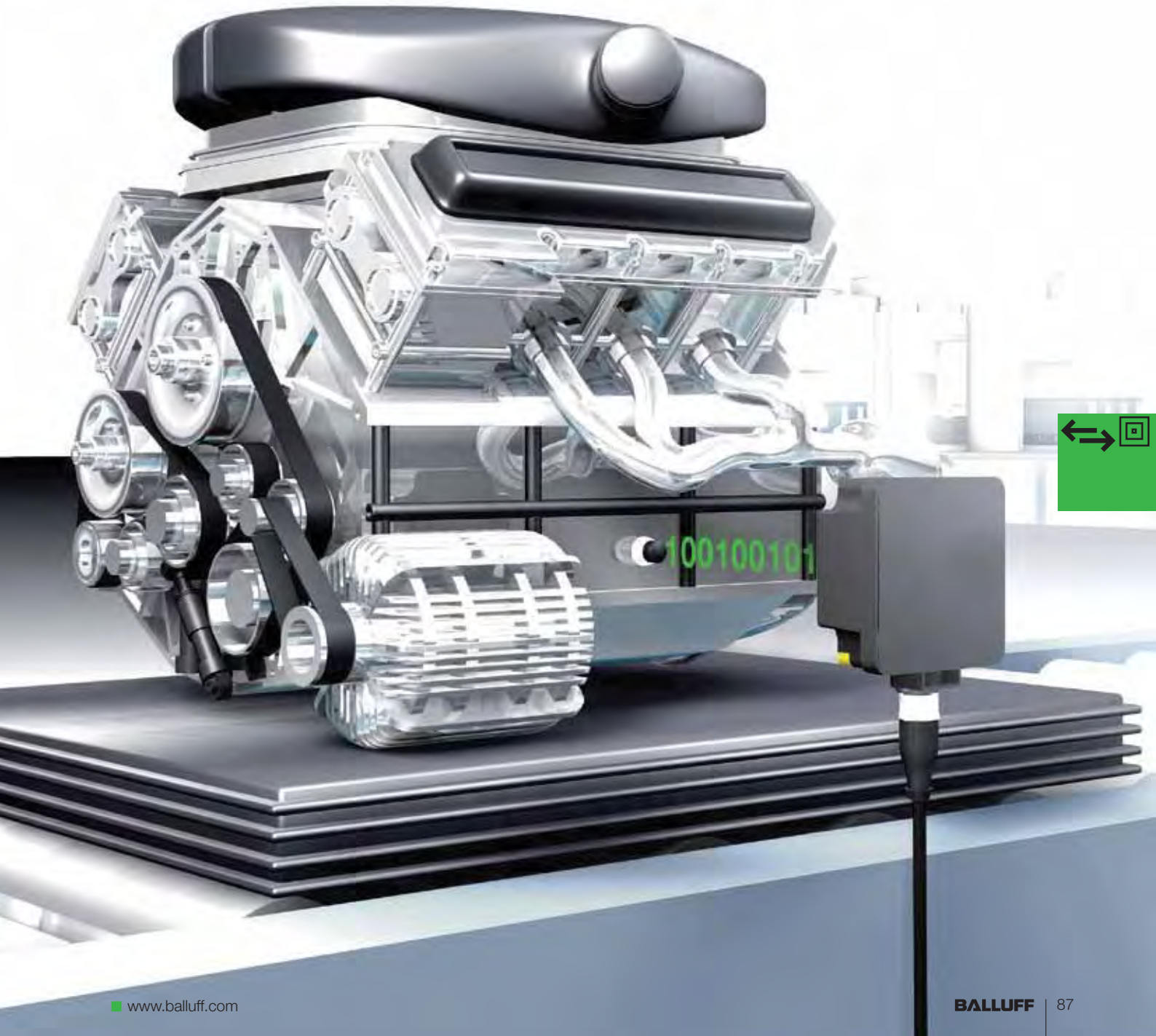
It is not always possible to use a workpiece carrier in the production process. If the information should still be coupled directly to the object, it is essential to install the data carrier at the object without any difficulties and to quickly remove it again after it has fulfilled its task. The design of a screw is perfectly suited for this purpose.

The new data carrier in accordance with ISO 15693 with a storage capacity of 2000 bytes is perfectly suited, for example, for parts tracking in manufacturing processes and for closed-loop applications in which it is always being used recurrently. Varied application options also open up for the identification of manufacturing equipment, such as pressing tools. Thanks to large reading distances, the data screw with degree of protection IP68/x9K offers many degrees of freedom during the installation.

Ordering code	BIS00M8	BIS00M9
Part number	BIS M-140-02/A-M8	BIS M-140-02/A-M6
Mounting	M8 thread	M6 thread
Memory capacity read/write	2000 bytes	2000 bytes
Degree of protection per DIN EN 40050	IP 68	IP 68
Storage temperature range	–25...+95 °C	–25...+95 °C

RF Databolt BIS M

Industrially hardened – maximum reusability



BIS U RFID for manufacturing and logistics

Industrial RFID System BIS U

The right data at the right time at the right place

- Reliable identification over long distances
- Detect and evaluate multiple data carriers simultaneously
- Fastest data processing, even in dynamic applications
- Greater process transparency

For maximum tracking and reliability – at large distances

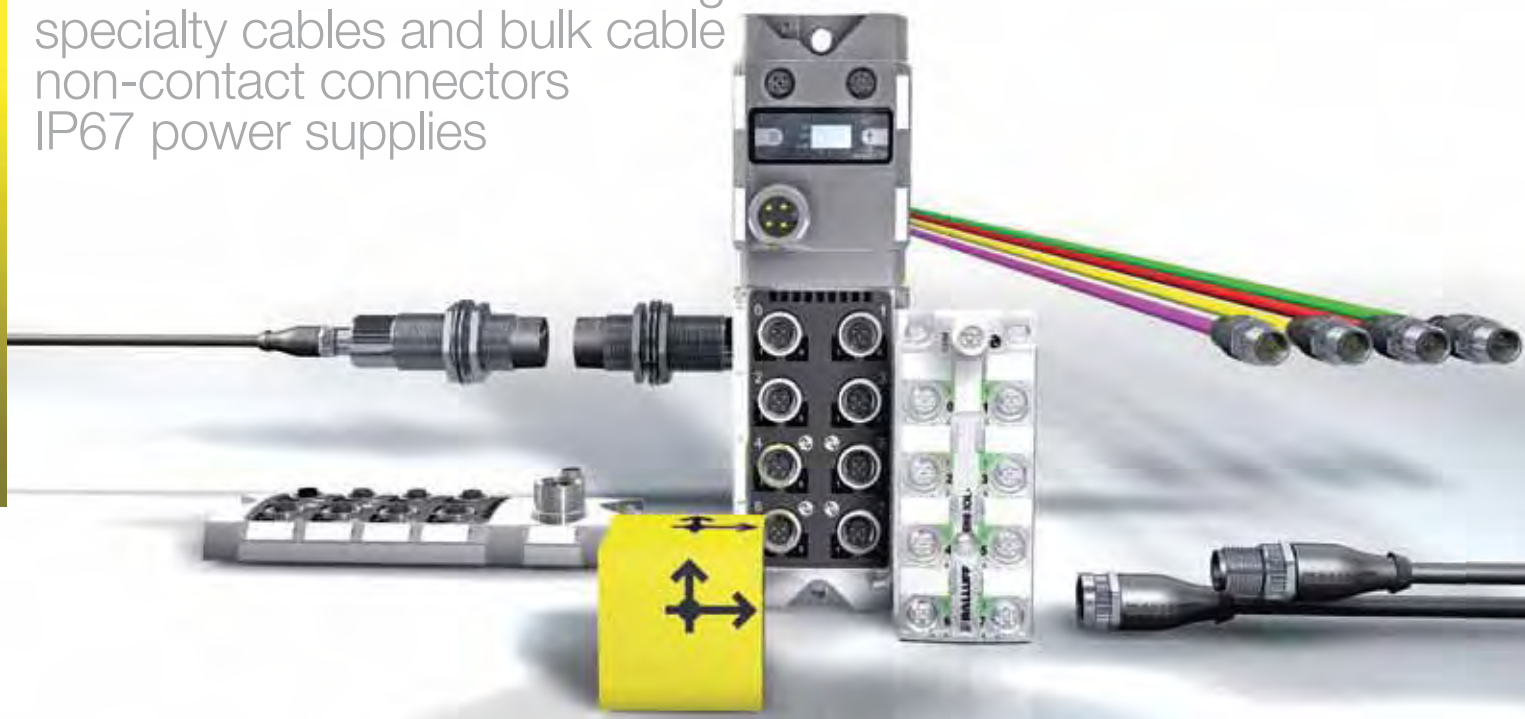
The Industrial RFID BIS U ensures fast read/write cycles and flexible communication. Even for large data quantities and in highly dynamic applications. The BIS U thereby ensures 100% quality and, with an operating range of 6 m, bridges even large distances. The BUS U can detect and process multiple data carriers at once. Regardless of how you align the data carrier – you are completely flexible with the circular polarized antenna. Our rugged BIS U systems are simple to integrate into host controller systems: worldwide standards are not only the newest technology, they also bring investment security.

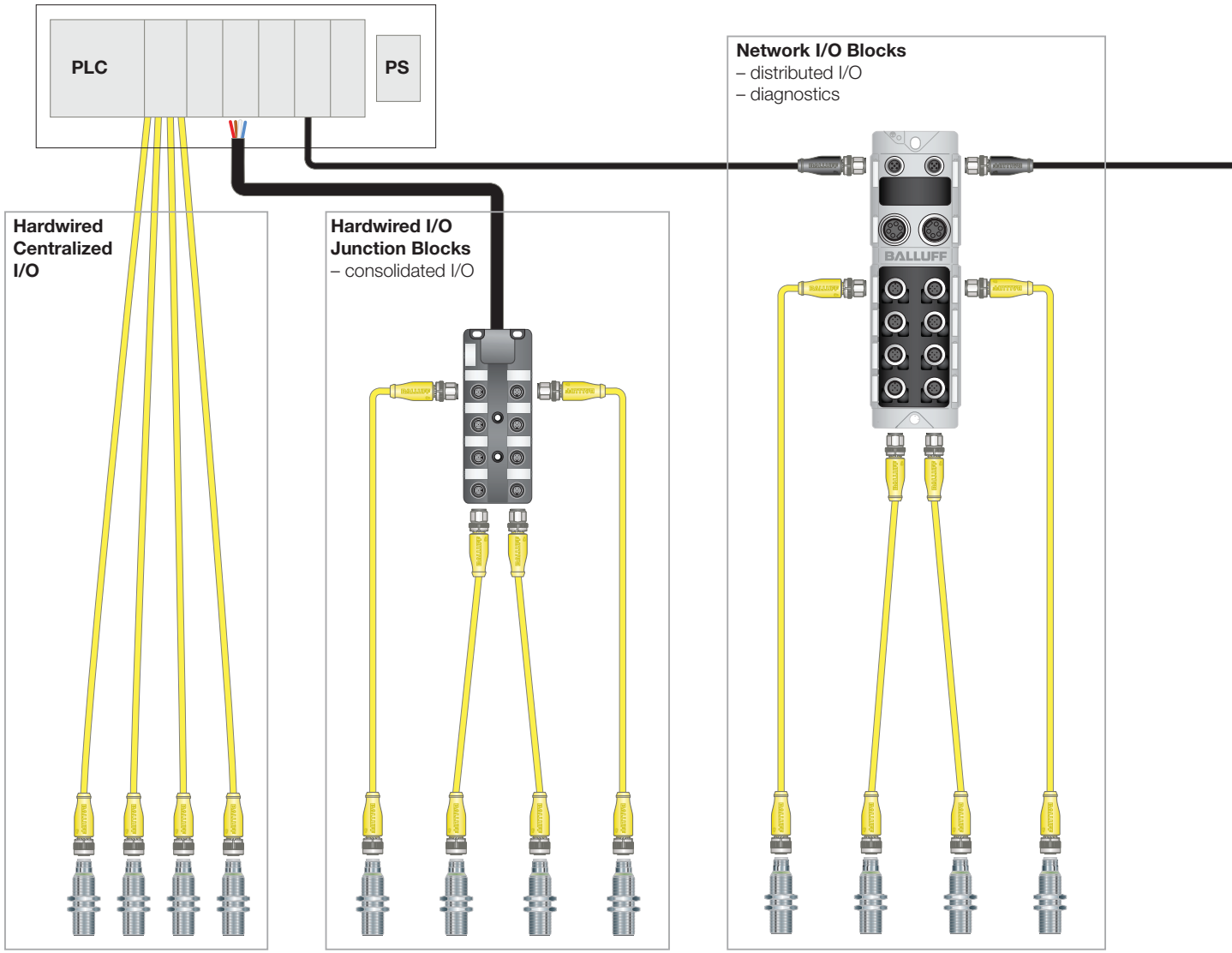
Contact Balluff today for more information and to arrange a site survey.

Order the new BIS U Industrial RFID systems catalog at **www.balluff.com**

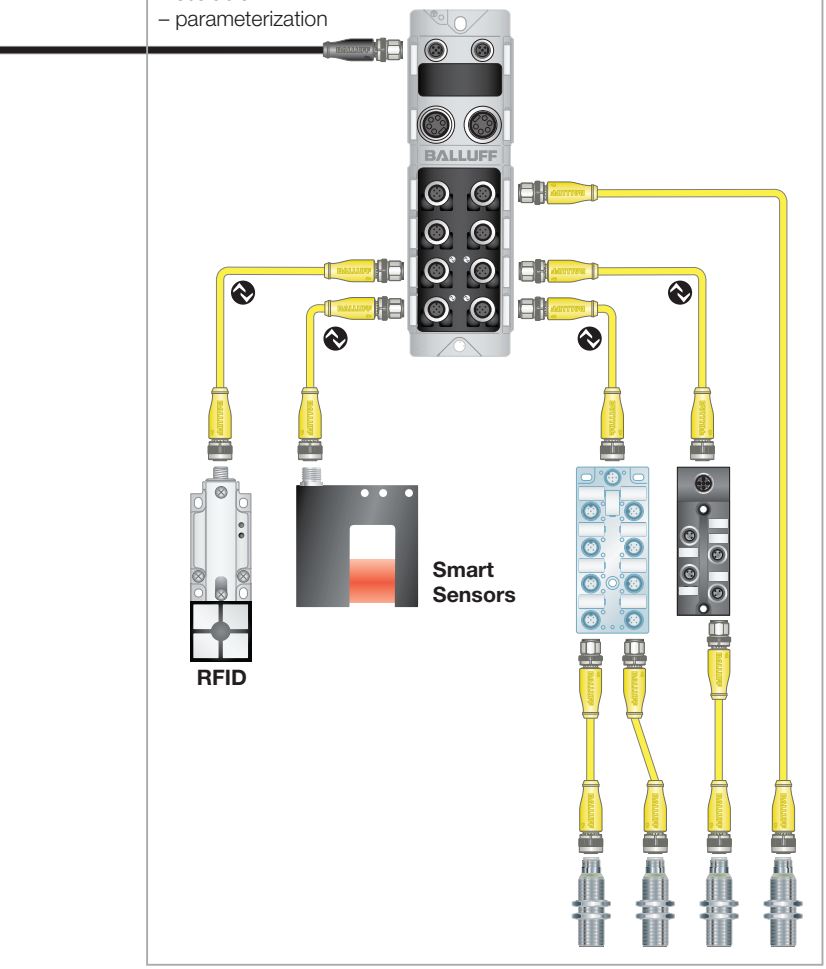
industrial networking and connectivity

ethernet/IP
CC-link
Distributed Modular I/O utilizing IO-Link
specialty cables and bulk cable
non-contact connectors
IP67 power supplies




PLC
PS
Network I/O Blocks
– distributed I/O
– diagnostics
Hardwired
Centralized
I/O
Hardwired I/O
Junction Blocks
– consolidated I/O
BALLUFF

Network Blocks with IO-Link
– distributed I/O
– diagnostics
– scalable
– parameterization



Hardwired Centralized I/O

Advantages
- Low component cost
- Basic electrical knowledge needed
- Low MRO costs

Disadvantages
- No diagnostics
- Hard to troubleshoot
- High maintenance cost
- Large number of cables routed to controls cabinet
- Long sensor cables
- Long downtime

Hardwired I/O with Junction Blocks

Advantages
- Low component cost
- Basic electrical knowledge needed
- Low MRO costs
- Fewer multi-conductor cables back to controls cabinet
- Shorter sensor cables

Disadvantages
- No diagnostics
- Hard to troubleshoot
- High maintenance cost
- Long downtime

Network I/O Blocks

Advantages
- Diagnostics
- Faster troubleshooting
- One cable back to the controls cabinet
- Lower maintenance cost
- Shorter sensor cables
- Higher up time

Disadvantages
- Higher component costs
- Network knowledge needed

IO-Link Modular Network I/O

Advantages
- Diagnostics
- Faster troubleshooting
- One cable back to the controls cabinet
- Lower maintenance cost
- Shorter sensor cables
- Higher up time
- Scalable
- Parameterization

Disadvantages
- Higher component costs
- Network knowledge needed

Ethernet/IP with IO-Link functionality
IO-Link not only communicates with Profibus, Profinet and CC-Link now. At Balluff, IO-Link now communicates with Ethernet/IP so that all the benefits of IO-Link are available right down to the second lowest level.

IO-Link not only ensures freedom of installation, but also guarantees simplified wiring, integrated diagnostics and central configuration. System failures can be reliably prevented and systems started up again quickly if the worst comes to the worst.

Ethernet/IP with IO-Link guarantees efficient operation, saves time, reduces costs and incorporates intelligent connection technology to improve process quality.

The Ethernet/IP module with IO-Link includes four IO-Link master ports that can be configured and used fully independently of one another. You get four additional, freely configurable standard I/O ports that provide a further eight inputs/outputs for standard sensors and actuators.

Fieldbus	Ethernet/IP
Type	4× IO-Link, 12 DI/DO PNP
Ordering code	**BNI004A**
Part number	BNI EIP-502-105-Z015
Operating voltage U_B	18...30 V DC
Module current consumption	120 mA...130 mA
AUX input/output power status UA LED	US /no
Module status indicator: Mod LED	Yes
Network status indicator: Net LED	Yes
Port status indicator	Black, red, yellow
Connection: Fieldbus	M12, D-coded, female
Connection AUX power	7/8", male, 4-pin
Connection: I/O ports	M12, A-coded, female
No. of I/O ports	8
Number of inputs	max. 12 PNP
Number of outputs	max. 12 PNP
Configurable inputs/outputs	Yes
Max. load current sensors/channel	200 mA
Max. output load current	1.6 A/2 A
Port status indicator (signal status)	Yellow LED
Port diagnostic indicator (overload)	Red LED
Total current $U_{Actuator}$	≤ 9 A
Total current U_{Sensor}	≤ 9 A
Degree of protection per IEC 60529	IP 67 (when connected)
Operating temperature T_a	–5...+70 °C
Storage temperature range	–25...+70 °C
Mounting	2 mounting holes
Dimensions (L×W×H)	225×68×36.9 mm
Housing material	Nickel-plated Gd-Zn

IO-Link

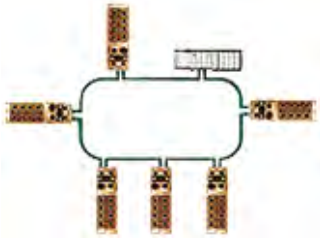
No. of IO-Link master ports		4× master
Operating modes (3-wire)		SIO, COM 1, COM 2, COM 3
Indicators	Communication	Green LED
	Error	Red LED
Max. load current for IO-Link device		1.6 A

EtherNet/IP
Network Block I/O with embedded switch

	Ethernet/IP	Ethernet/IP
	16 DI PNP	16 DI/DO PNP
	BNI004M	**BNI004F**
	BNI EIP-104-105-Z015	BNI EIP-302-105-Z015
	18...30 V DC	18...30 V DC
	120 mA...130 mA	120 mA...130 mA
	US /no	US /no
	Yes	Yes
	Yes	Yes
	Black, red, yellow	Black, red, yellow
	M12, D-coded, female	M12, D-coded, female
	7/8", male, 4-pin	7/8", male, 4-pin
	M12, A-coded, female	M12, A-coded, female
	8	8
	16 PNP	max. 16 PNP
		max. 16 PNP
	No	Yes
	200 mA	200 mA
	2 A	2 A
	Yellow LED	Yellow LED
	Red LED	Red LED
	≤ 9 A	≤ 9 A
	≤ 9 A	≤ 9 A
	IP 67 (when connected)	IP 67 (when connected)
	–5...+70 °C	–5...+70 °C
	–25...+70 °C	–25...+70 °C
	2 mounting holes	2 mounting holes
	225×68×36.9 mm	225×68×36.9 mm
	Nickel-plated Gd-Zn	Nickel-plated Gd-Zn

DeviceLevel Ring (DLR)

One fault tolerant ring topology



Webserver configuration and diagnostics

View LED status and configure parameters from anywhere

- Clearly visible status LEDs
- Addressable display
- Powerful and safe outputs
- Innovative housing design

CC-Link is the principle fieldbus technology used in Asia. The open network is supported by the global CC-Link partner association CLPA, which comprises more than 1000 companies. CC-Link is a standardized fieldbus designed to integrate different automation components from a wide range of providers. CC-Link is an effective integral system that will fulfill 100 % of your application requirements. Utilize the extensive, high-quality CC-Link portfolio from Balluff to implement your own powerful control topologies using products from a single source.

CC-Link with IO-Link functionality
A module with four IO-Link ports is now available to supplement the CC-Link fieldbus module product series.

The CC-Link module with IO-Link includes four IO-Link master ports that can be configured and used fully independently of one another. You get four additional, freely configurable standard I/O ports that provide a further eight inputs/outputs for standard sensors and actuators.

IO-Link

NPN

Fieldbus	CC-Link	CC-Link
Type	4× IO-Link, 12 DI/DO PNP	16 DI NPN
Ordering code	**BNI0040**	**BNI0049**
Part number	BNI CCL-502-100-Z001	BNI CCL-106-100-Z001
Operating voltage U_B	18...30 V DC	18...30 V DC
Function indicator	Green LED	Green LED
Fault function indicator	Red LED	Red LED
Power indicator	Green LED	Module/actuator/sensor supply
Connection: Fieldbus	M12, 5-pin, female and male	M12, 5-pin, female and male
Connection: Operating voltage	7/8", 5-pin, female and male	7/8", 5-pin, female and male
Connection: I/O ports	M12, A-coded, female	M12, A-coded, female
No. of I/O ports	8	8
Number of inputs	max. 12 PNP	16 NPN
Number of outputs	max. 12 PNP	
Configurable inputs/outputs	Yes	No
Max. load current sensors/channel	200 mA	200 mA
Max. output load current	1.6 A/2 A	
Port status indicator (signal status)	Yellow LED	Yellow LED
Port diagnostic indicator (overload)	Red LED	Red LED
Total current $U_{Actuator}$	≤ 9 A	≤ 9 A
Total current U_{Sensor}	≤ 9 A	≤ 9 A
Degree of protection per IEC 60529	IP 67 (when connected)	IP 67 (when connected)
Operating temperature T_a	–5...+70 °C	–5...+55 °C
Storage temperature range	–25...+70 °C	–25...+75 °C
Weight	Approx. 577 g	Approx. 577 g
Mounting	2 mounting holes	2 mounting holes
Dimensions (L×W×H)	224×68×36.9 mm	224×68×36.9 mm
Housing material	Nickel-plated Gd-Zn	Nickel-plated Gd-Zn

IO-Link

No. of IO-Link master ports		4× master
Operating modes (3-wire)		SIO, COM 1, COM 2, COM 3
Indicators	Communication	Green LED
	Error	Red LED
Max. load current for IO-Link device		1.6 A

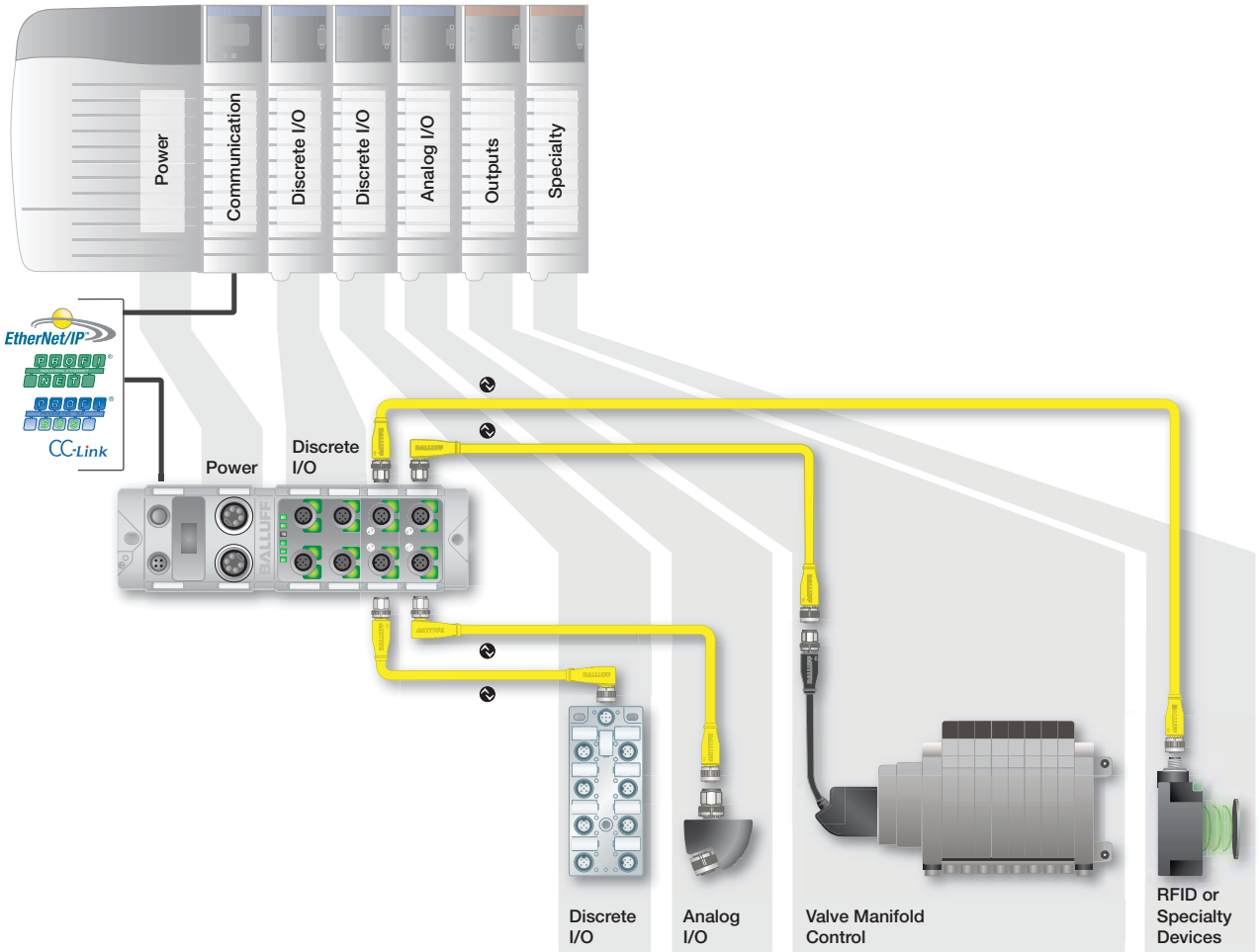
CC-Link
Powerful products from a single source

PNP

	CC-Link	CC-Link	CC-Link	CC-Link
	16 DI PNP	16 DI/DO PNP	8 DI + 8 DO PNP	8 DO
	BNI002F	**BNI002A**	**BNI002C**	**BNI002E**
	BNI CCL-104-100-Z001	BNI CCL-302-100-Z001	BNI CCL-305-100-Z001	BNI CCL-202-100-Z001
	18...30 V DC	18...30 V DC	18...30 V DC	18...30 V DC
	Green LED	Green LED	Green LED	Green LED
	Red LED	Red LED	Red LED	Red LED
	Module/actuator/sensor supply	Module/actuator/sensor supply	Module/actuator/sensor supply	Module/actuator/sensor supply
	M12, 5-pin, female and male	M12, 5-pin, female and male	M12, 5-pin, female and male	M12, 5-pin, female and male
	7/8", 5-pin, female and male	7/8", 5-pin, female and male	7/8", 5-pin, female and male	7/8", 5-pin, female and male
	M12, A-coded, female	M12, A-coded, female	M12, A-coded, female	M12, A-coded, female
	8	8	8	8
	16 PNP	max. 16 PNP	8 PNP	
		max. 16 PNP	8 PNP	8 PNP
	No	Yes	No	No
	200 mA	200 mA	200 mA	200 mA
		2 A	2 A	2 A
	Yellow LED	Yellow LED	Yellow LED	Yellow LED
	Red LED	Red LED	Red LED	Red LED
	≤ 9 A	≤ 9 A	≤ 9 A	≤ 9 A
	≤ 9 A	≤ 9 A	≤ 9 A	≤ 9 A
	IP 67 (when connected)	IP 67 (when connected)	IP 67 (when connected)	IP 67 (when connected)
	–5...+55 °C	–5...+55 °C	–5...+55 °C	–5...+55 °C
	–25...+75 °C	–25...+75 °C	–25...+75 °C	–25...+75 °C
	Approx. 577 g	Approx. 577 g	Approx. 577 g	Approx. 577 g
	2 mounting holes	2 mounting holes	2 mounting holes	2 mounting holes
	224×68×36.9 mm	224×68×36.9 mm	224×68×36.9 mm	224×68×36.9 mm
	Nickel-plated Gd-Zn	Nickel-plated Gd-Zn	Nickel-plated Gd-Zn	Nickel-plated Gd-Zn

Think of a remote “slice” I/O solution. In a typical application, the communication head and the power supply sit on the left hand side and are followed along the backplane by the individual I/O devices, such as discrete 24V input cards or 0-10V analog cards. Usually there are a limited number of slots available in the backplane and individual slices of control components can be inserted.

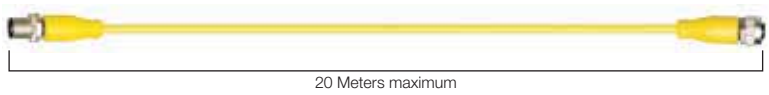
In a similar fashion, a Distributed Modular I/O system has a communications head that talks over the desired industrial network on one side and acts as a data collector on the right hand side. In lieu of a backplane, each device is connected to an industry standard M12 port utilizing a basic 3-wire sensor cable for communication. With the ability to be installed within a 20 meter radius from the data collector devices can be easily distributed across the machine.

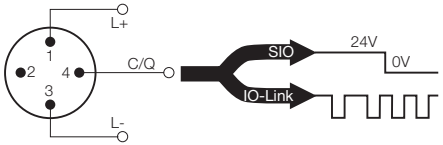


The backplane of Distributed Modular I/O = IO-Link

Utilizing a widely accepted and open point to point technology, IO-Link, a Distributed Modular I/O system is fieldbus independent, is easily configured and is vendor neutral. Process data shows up as simple packets of bytes in the controller for easy integration. The parameterization data allows the devices to be quickly configured using simple read/write commands, and best of all, there is no “sub-bus” to cause headaches, nor is there some new protocol to be educated on. The digital signal is carried over pin 4 of a standard cable and 24V power is provided to the device in a standard configuration. If required, the IO-Link port can be used for a standard I/O point.

3 Wire or 4 Wire Sensor Cable





Types of Distributed Modular I/O devices

Discrete I/O

M8 ports
– *Up to 16 inputs*

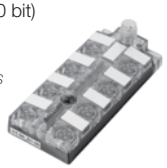
M12 ports
– *Up to 16 inputs*
– *16 outputs*
– *16 configurable*

IP20 terminals
– *Up to 16 configurable*

Analog I/O

1 channel (14 bit)
– *0-10 V in/out*
– *4-20mA in/out*
– *PT100 in*

4 channels (10 bit)
– *0-10 V in*
– *4-20mA in*
– *plus 8 inputs*



Valve Manifold Control

25 pin D-sub

IP67 & Terminal

Specialty Devices and RFID

Measurement and position sensors

RFID
– *Read/write*
– *Read only*

Non-contact connectors
– *3 bytes to 11 bytes*

IO-Link sensor hubs with ID

Simple handling – lower costs – universal use
IO-Link sensor hubs with ID from Balluff are a market innovation. The user can write and read his own, user-defined identification data. They are, therefore, particularly economical when it is necessary to encode tools. In addition, they are easy to use.

As an interface for interchangeable tools, they offer clearly calculable benefits:
- Quick, reliable format changes
- Quick, economical installation
- Speedy setup

Additional advantages
- IP 67 sensor hubs are extremely versatile.
- Single-channel monitoring provide detailed diagnostic data relating to overloads, short circuits and cable breaks.

ID sensor hubs from Balluff represent more than just lower costs, less work and reduced downtimes. Sensor hubs with ID from Balluff also stand for greater efficiency.

CE
IO-Link

IO-Link	Device	Device
Type	16× DI	16× DI/DO
Ordering code	**BNI003T**	**BNI0048**
Part number	BNI IOL-104-S01-Z012-C01	BNI IOL-302-S01-Z013-C01
Operating voltage U_B	18...30 V DC	18...30 V DC
Function indicator IO-Link RUN	Green LED	Green LED
Power indicator	Green LED	Green LED
Connection: IO-Link	M12, A-coded, male	M12, A-coded, male
Connection: I/O ports	M12, A-coded, female	M12, A-coded, female
Connection U_O	via IO-Link interface	via 7/8" connector
Connection U_A		via 7/8" connector
No. of I/O ports	8	8
Number of inputs	16	Max. 16
Number of outputs	0	Max. 16
Configurable		Yes
Single-channel monitoring	Yes	Yes
Max. load current sensors/channel	100 mA	500 mA
Max. load current actuators/channel		2 A
Port status indicator	Yellow/red LED	Yellow/red LED
Total current U_B	< 1.4 A	9 A
Total current U_A		9 A
Degree of protection per IEC 60529	IP 67 (when connected)	IP 67 (when connected)
Operating temperature T_a	–5...+70 °C	–5...+70 °C
Storage temperature range	–25...+70 °C	–25...+70 °C
Mounting	2 mounting holes	2 mounting holes
Dimensions (L×W×H)	181×68×36.9 mm	181×68×36.9 mm
Housing material	Nickel-plated Gd-Zn	Nickel-plated Gd-Zn

IO-Link

Max. cycle time		15 ms	30 ms
IO-Link process data length		6 input bytes	10 byte input/2 byte output
Indicators	Communication	Green LED, pulsing	Green LED, pulsing
	Error	Red LED	Red LED

All hubs include 4 screw plugs and 1 label set.

Easy installation with IO-Link under IP 20 conditions
The maximum number of 16 channels of the IP 20 IO-Link sensor/actuator hub are user configurable (input/output) and meet the requirements for an inexpensive flexible wiring. The connection on the IO-Link side is carried out using a four-pole standard sensor cable, the connection from/to the I/O devices is carried out using detachable screw-type terminal blocks.

IO-Link up to the control panel
The compact size enables the simple and straightforward installation in control cabinets, control boxes and control panel housings. Simply snap the plastic housing onto a mounting rail according to EN 60175 – done.

IO-Link for integration in devices and device modules
Circuit board variants are available for the integration in spatially limited and complex functional units which can be integrated via spacing bolts.

IO-Link		Device	Device
Type		8× DI/DO	16× DI/DO
Ordering code		**BNI004K**	**BNI004L**
Part number		BNI IOL-309-000-K024	BNI IOL-310-000-K025
Operating voltage U_B		18…30 V DC	18…30 V DC
Function indicator IO-Link RUN		Green LED	Green LED
Power indicator		Green LED	Green LED
Connection: IO-Link		Spring-loaded terminal, pluggable	Spring-loaded terminal, pluggable
Connection U_O		Spring-loaded terminal, pluggable	Spring-loaded terminal, pluggable
Connection U_A		Spring-loaded terminal, pluggable	Spring-loaded terminal, pluggable
Connection: I/O ports		Spring-loaded terminal, pluggable	Spring-loaded terminal, pluggable
No. of I/O ports		8	16
Number of inputs		Max. 8	Max. 16
Number of outputs		Max. 8	Max. 16
configurable/parameterizable		Yes	Yes
Single-channel monitoring		No	No
Max. load current sensors/channel		100 mA	100 mA
Max. load current actuators/channel		400 mA	400 mA
Port status indicator		Yellow LED	Yellow LED
Total current U_S		< 1.4 A	< 1.4 A
Total current U_A		< 1.4 A	< 1.4 A
Degree of protection per IEC 60529		IP 20	IP 20
Operating temperature T_a		–5…+50 °C	–5…+50 °C
Storage temperature range		–25…+75 °C	–25…+75 °C
Mounting		Top-hat rail fitting over plastic shell	Top-hat rail fitting over plastic shell
Dimensions (L×W×H)		49×84×43 mm (L×W×H)	79×84×43 mm (L×W×H)
IO-Link			
No. of IO-Link ports		1× device	1× device
Max. cycle time			12 ms
IO-Link process data length		1 Byte Input/1 Byte Output	2 Bytes Input/2 Bytes Output
Indicators	Communication	Green LED, pulsing	Green LED, pulsing
	Error	Red LED	Red LED

Converting analog signals into IO-Link signals and saving costs in the process
The number of analog data/ information/signals generally do not represent 10% of the existing signal formation in most systems and machines.

The connection and integration of analog input/output signals is associated with high costs due to the use of shielded cables on the installation side and expensive multi-channel input modules on the control side.

The solution
The IO-Link Analog Plugs from Balluff open up a considerable cost reduction potential for systems with limited analog value formation.
Expensive shielded cables are replaced with simple unshielded three-core cables. The signal neutrality of the IO-Link ports of the IO-Link master modules together with the IO-Link analog plugs ensures maximum signal variance. Hence, "mixing" different input/output/current and voltage signals in one module is possible.

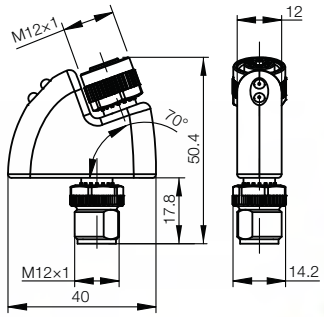
Your benefits
– compact housing
– 14 bits high resolution
– Extended temperature range
– Inputs and outputs

IO-Link		Device	Device
Type		1 AI, 0…10 V DC	1 AI, 4…20 mA
Ordering code		**BNI0042**	**BNI0041**
Part number		BNI IOL-714-000-K023	BNI IOL-712-000-K023
Operating voltage U_B		18…30 V DC	18…30 V DC
Connection: IO-Link		M12, A-coded, male	M12, A-coded, male
Analog interface connection		M12, A-coded, female	M12, A-coded, female
Analog ports			
Number of analog ports		1	1
Interface		0…10 V DC Input	4…20 mA Input
Resolution		14 Bit	14 Bit
Max. load current sensors/channel		1 A	1 A
Max. load current actuators/channel		1.4 A	1.4 A
Degree of protection per IEC 60529		IP 67 (when connected)	IP 67 (when connected)
Operating temperature T_a		–5…+70 °C	–5…+70 °C
Storage temperature range		–25…+70 °C	–25…+70 °C
Weight		21 g	21 g
Dimensions (L×W×H)		40×12×50 mm	40×12×50 mm
Housing material		Plastic	Plastic

IO-Link

Max. cycle time		3 ms	3 ms
IO-Link process data length		2 Bytes Input	2 Bytes Input
Indicators	Communication	Green LED, pulsing	Green LED, pulsing
	Module OK	Green LED	Green LED

	Device	Device	Device
	1 AI, PT100	1 AO, 0…10 V DC	1 AO, 4…20 mA
	BNI004T	**BNI004C**	**BNI004E**
	BNI IOL-716-000-K023	BNI IOL-722-000-K023	BNI IOL-724-000-K023
	18…30 V DC	18…30 V DC	18…30 V DC
	M12, A-coded, male	M12, A-coded, male	M12, A-coded, male
	M12, A-coded, female	M12, A-coded, female	M12, A-coded, female
	1	1	1
	PT 100 Input	0…10 V DC Output	4…20 mA Output
	14 Bit	14 Bit	14 Bit
	1 A	1 A	1 A
	1.4 A	1.4 A	1.4 A
	IP 67 (when connected)	IP 67 (when connected)	IP 67 (when connected)
	–5…+70 °C	–5…+70 °C	–5…+70 °C
	–25…+70 °C	–25…+70 °C	–25…+70 °C
	21 g	21 g	21 g
	40×12×50 mm	40×12×50 mm	40×12×50 mm
	Plastic	Plastic	Plastic
	3 ms	3 ms	3 ms
	2 Bytes Input	2 Bytes Output	2 Bytes Output
	Green LED, pulsing	Green LED, pulsing	Green LED, pulsing
	Green LED	Green LED	Green LED



M8 and M12 Specialty Cables		
Type	IP69K Rated	
Configuration	Stainless Nut, PUR cable	
Voltage Rating	60 V (M8 3-wire), 250 V (M12)	
Amperage	4 A	
M8 Versions		
M8 Female, 3-wire, Straight		
M8 Female, 3-wire, Right Angle		
M8 Female, 3-wire, Right Angle, N/O PNP-LED	**BCC S323-0000-10-004-PX0334-_ _ _**	
M8 Female, 4-wire, Straight		
M8 Female, 4-wire, Right Angle		
M12 Versions		
M12 Female, 3-wire, Right Angle, PNP-LED, N/O	**BCC S425-0000-1A-004-PX0334-_ _ _**	
M12 Female, 4-wire, Straight	**BCC S415-0000-1A-003-PX8434-_ _ _**	
M12 Female, 4-wire, Straight, N/O PNP-LED		
M12 Female, 4-wire, Right Angle	**BCC S425-0000-1A-003-PX8434-_ _ _**	
M12 Female, 4-wire, Right Angle, N/O PNP-LED	**BCC S425-0000-1A-008-PX0434-_ _ _**	
M12 Female, 5-wire, Straight		
M12 Female, 5-wire, Straight, Braided Shield		
M12 Female, 5-wire, Right Angle		
M12 Female, 5-wire, Right Angle, Braided Shield		
M12 Female, 8-wire, Straight, Braided Shield		

Standard Lengths Available:

LED	Non-LED
030 = 3.0 meters	100 = 10.0 meters
050 = 5.0 meters	150 = 15.0 meters
100 = 10.0 meters	200 = 20.0 meters

	1.4404 Stainless, ECOLAB, H2O2 Reistant	1.4404 Stainless	High Temperature
	Stainless Nut, Grey Overmold & PUR Cable	Stainless Nut, Yellow Overmold & PVC Cable	-25°C…120°C
	60 V (M8 3-wire), 30 V (M8 4-wire), 250 V (M12 non-LED), 36 V (M12 LED)	60 V (M8 3-wire), 30 V (M8 4-wire), 250 V (M12 non-LED), 36 V (M12 LED)	125 VAC / 150 VDC
	4 A	4 A	4 A
	BCC S313-0000-10-001-PX8334-100-C002	**BCC S313-0000-10-001-VX43T2-_ _ _**	**BCC M313-0000-10-001-PH0334-050**
	BCC S323-0000-10-001-PX8334-100-C002	**BCC S323-0000-10-001-VX43T2-_ _ _**	
	BCC S323-0000-10-004-PX8334-030-C002		
	BCC S314-0000-10-003-PX8434-100-C002	**BCC S314-0000-10-003-VX44T2-_ _ _**	
	BCC S324-0000-10-003-PX8434-100-C002	**BCC S324-0000-10-003-VX44T2-_ _ _**	
	BCC S425-0000-1A-004-PX8334-030-C002	**BCC S425-0000-1A-004-VX43T2-_ _ _**	**BCC M415-0000-1A-001-PH0334-_ _ _**
	BCC S415-0000-1A-003-PX8434-_ _ _-C002	**BCC S415-0000-1A-003-VX44T2-_ _ _**	**BCC M425-0000-1A-001-PH0334-_ _ _**
		BCC S415-0000-1A-008-VX44T2-_ _ _	
	BCC S425-0000-1A-003-PX8434-_ _ _-C002	**BCC S425-0000-1A-003-VX44T2-_ _ _**	
	BCC S425-0000-1A-008-PX8434-100-C002	**BCC S425-0000-1A-008-VX44T2-_ _ _**	
	BCC S415-0000-1A-017-PX8534-_ _ _-C002		
	BCC S415-0000-1A-017-PS8525-_ _ _-C002		
	BCC S425-0000-1A-017-PX8534-_ _ _-C002		
	BCC S425-0000-1A-017-PS8525-100-C002		
	BCC S418-0000-1A-069-PS8825-_ _ _-C002		
	Standard Lengths Available: 100 = 10.0 meters 200 = 20.0 meters 250 - 25.0 meters	Standard Lengths Available: 020 = 2.0 meters 050 = 5.0 meters 100 = 10.0 meters	Standard Lengths Available: 020 = 2.0 meters 050 = 5.0 meters 100 = 10.0 meters

M8 Splitters

Type		M8 Female (x2) - M12 Male	M8 Female (x2) - M12 Male
Configuration		Straight - Straight	Right Angle - Straight
Voltage Rating		60 VAC / 75 VDC	60 VAC / 75 VDC
Amperage		4 A	4 A
Wiring	**Jacket Mat.**		
3-wire, non-LED	PVC	**BCC M414-M313-M313-U2012-_ _ _**	**BCC M414-M323-M323-U2012-_ _ _**

M12 Splitters

Type		Flying Leads (x2) - M12 Male	M12 Female (x2) - M12 Male
Configuration		Open - Straight	Straight - Straight
Voltage Rating		250 VAC/ VDC	250 VAC / VDC
Amperage		4 A	4 A
Wiring	**Jacket Mat.**		
3-wire, non-LED, N/O	PVC	**BCC M414-0000-0000-U2009-_ _ _**	**BCC M414-M415-M415-U2010-_ _ _**
3-wire, non-LED, N/O	TPE		**BCC M414-M415-M415-U2002-_ _ _**
3-wire, PNP-LED, N/O	TPE		**BCC M414-M415-M415-U2011-_ _ _**
3-wire+PE, non-LED, N/O	PVC		
3-wire, AND Logic	TPE		**C04 EEC-04-TY-002M-V-F039**
4-wire+PE, OR Logic	PVC		
3-wire, N/C or N/O, non-LED	PUR (black)		**BCC M414-M415-M415-U2018-002**

	M8 Female (x2) - M12 Male
	U-style
	60 VAC / 60 VDC
	4 A
	BCC M415-M313-M313-U0014-000

Standard Lengths Available:
003 = 0.3 meters
006 = 0.6 meters
010 = 1.0 meters
020 = 2 meters
050 = 5 meters

	M12 Female (x2) - M12 Male	M12 Female (x2) - M12 Male
	Right Angle - Straight	U-style
	250 VAC / VDC	250 VAC / VDC
	4 A	4 A
	BCC M414-M425-M425-U2010-_ _ _	
	BCC M414-M425-M425-U2002-_ _ _	
	BCC M414-M425-M425-U2011-_ _ _	
		BCC M415-M415-M415-U0003-000
		BCC M415-M415-M415-U0016-000

Standard Lengths Available:
003 = 0.3 meters
006 = 0.6 meters
010 = 1.0 meters
020 = 2 meters (flying leads)
050 = 5 meters (flying leads)

Bulk cable

Sometimes in automation applications it is necessary to wire individual connectors and cables by hand, using bulk cable. It is available for sensors, auxiliary power, and industrial networks.

Lengths Available: 100m coils or spools depending on cable size.

Cable for use with M8 & M12 Connectors & Sensors

# Wires	Conductors	Jacket Material	Wire AWG	Ordering code
3	BR, BU, BK	Yellow PVC	22 AWG	**BCC0AE7**
		Black PUR	22 AWG	**BCC0AE9**
		Black PUR	0.34mm2	**BCC0AC7**
		Yellow TPE	22 AWG	**BCC0AEC**
4	BR, WH, BU, BK	Yellow PVC	22 AWG	**BCC0AE8**
		Yellow PUR	22 AWG	**BCC0AEA**
		Black PUR	0.34mm2	**BCC0AC8**
		Yellow TPE	22 AWG	**BCC0AEE**
5	BR, WH, BU, BK, GY	Black PUR	0.34mm2	**BCC0AC9**

Cable for use with 7/8" Connectors and Aux Power

# Wires	Conductors	Jacket Material	Wire AWG	Ordering code
3	(AC) GN,BK,WH	Yellow PVC	16 AWG	**BCC0AEF**
4	(AC) BK,WH,RD,GN	Yellow PVC	16 AWG	**BCC0AEH**
	(DC) BR,WH,BU,BK	Yellow PVC	16 AWG	**BCC0AEJ**
		Black PUR	1.50mm2	**BCC0ACF**
		Yellow TPE	16 AWG	**BCC0APC**
5	(DC) BK,BU,GN,BN,WH	Yellow PVC	16 AWG	**BCC0AEK**
		Black PUR	1.50mm2	**BCC0ACH**

Cable for use with Industrial Networks

# Wires	Network	Jacket Material	Type	Ordering code
2x2	EtherNet/IP	Teal TPE		**BCC0AUJ***
		Teal PVC		**BCC0AZ9***
2x2+drain	DeviceNet	Grey PVC	Thick	**BCC0AEL**
		Grey PUR	Thick Flex	**BCC0AEM**
		Grey PVC	Mid	**BCC0AEN**
		Grey PVC	Thin	**BCC0AEP**
		Grey PUR	Thin Flex	**BCC0AER**
2	Profibus	Purple PUR		**BCC0ACA**

*Contact factory for availability

For a full offering of field attachables and other connectivity accessories, download the connectivity catalog at **www.balluff.com/connectivity**

Passive splitter box BPI, 5-pin

Ideal areas of application for passive splitter boxes by Balluff include local installations in assembly and handling machines, packaging technology, special machine construction, etc.

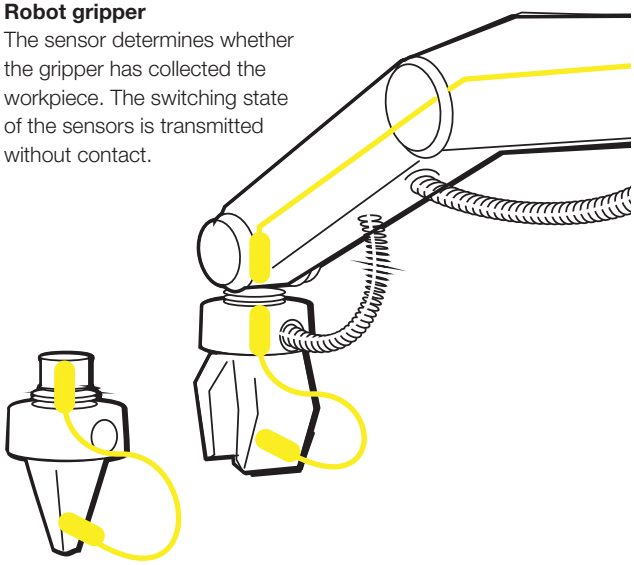
Balluff Passive Interface BPI – A multi-talent, even under demanding conditions

- Outstanding design
- Fully enclosed housing
- High shock and vibration ratings
- Flexible mounting options
- High visibility of LEDs
- Large terminal compartment
- Modular design
- Quick to mount/detach for transportation

Type	4-way, M12 with LEDs	8-way, M12 with LEDs
Ordering code	**BPI007K**	**BPI007H**
Part number	BPI 4M4A5P-2K-00-TPSG	BPI 8M4A5P-2K-00-TPSN
Rated power supply U_e	24 V DC	24 V DC
Operating voltage U_B	10...30 V DC	10...30 V DC
Function indicator	Yes	Yes
Power indicator	Green LED	Green LED
Sensor connection	5-pin female, M12×1	5-pin female, M12×1
Controller connection	Cap connection without cable	Cap connection without cable
Number of connections	4	8
Current load capacity	2 A	2 A
Total current	6 A	6 A
Housing material	PBT, GF, fully enclosed	PBT, GF, fully enclosed
Degree of protection per IEC 60529	IP 67 (when connected)	IP 67 (when connected)
Ambient temperature T_a	–25...+80 °C	–25...+80 °C
Version	PNP normally open/normally closed (NO/NC) ⎍ / ⎍	PNP normally open/normally closed (NO/NC) ⎍ / ⎍
Recommended connector - port	BCC M415...	BCC M415...

- Simple connection, rapid commissioning
- Wear-free
- Robust, even in harsh environments

Robot gripper
The sensor determines whether the gripper has collected the workpiece. The switching state of the sensors is transmitted without contact.



Size	
Working range	
Mounting type	
Ordering code	
Part number	
Operating voltage U_B incl. ripple	
Rated operating current I_e	
No-load supply current I_0 max.	
Max. current load per output	
Short-circuit protected	
Remote output voltage	
Power supply, continuous output current	
Rated insulation voltage U_i	
Operational readiness	
Ambient temperature range T_a	
Storage temperature range	
Displacement	
Switching frequency f	
Function/Power indicator	
Tightening torque	
Degree of protection per IEC 60529	
Housing material	
Material of sensing face	
Connection	

Retrofitting is simple: BIC is plug-and-play. Your maintenance costs are reduced to a minimum because cable breaks and mechanical wear are a thing of the past.

Non-contact Connectors
Power-only

Power-only with 0.2 A power		Power-only with 0.5 A power	
M30×1.5	**M30×1.5**	**M30×1.5**	**M30×1.5**
0...5 mm	**0...5 mm**	**0...5 mm**	**0...5 mm**
Non-flush	Non-flush	Non-flush	Non-flush
BIC0051	**BIC0052**	**BIC0007**	**BIC0008**
BIC 1P0-P2A20-M30MI3-SM4A4A	BIC 2P0-P2A20-M30MI3-SM4A5A	BIC 1P0-P2A50-M30MI3-SM4A4A	BIC 2P0-P2A50-M30MI3-SM4A5A
24 V DC ±10 %		24 V DC ±10 %	
max. 500 mA		max. 1 A	
100 mA		100 mA	
Yes	Yes	Yes	Yes
	24 V DC ±5 %		24 V DC ±5 %
	500 mA		500 mA
150 V DC/125 V AC	150 V DC/125 V AC	150 V DC/125 V AC	150 V DC/125 V AC
	100 ms		100 ms
–5...+55 °C	–5...+55 °C	0...+55 °C	0...+55 °C
–25...+75 °C	–25...+75 °C	–25...+75 °C	–25...+75 °C
	±4 mm		±4 mm
10 Hz	10 Hz	10 Hz	10 Hz
Yes/yes	Yes/yes	Yes/yes	Yes/yes
70 Nm	70 Nm	70 Nm	70 Nm
IP 67	IP 67	IP 67	IP 67
CuZn coated	CuZn coated	CuZn coated	CuZn coated
PC	PC	PC	PC
M12 connector, male 4-pin	M12 connector, female 5-pin	M12 connector, male 4-pin	M12 connector, female 5-pin

For more information on BIC non-contact connectors, refer to our "Industrial Networking and Connectivity" catalog or visit us online at **www.balluff.com**

	Uni-standard with 0.5 A power and 8 signals	
Size	**M30×1.5**	**M30×1.5**
Working range	**0...5 mm**	**0...5 mm**
Mounting type	Non-flush	Non-flush
Ordering code	**BIC0009**	**BIC000A**
Part number	BIC 1I3-P2A50-M30MI3-SM4ACA	BIC 2I3-P2A50-M30MI3-SM4ACA
Operating voltage U_B incl. ripple	24 V DC ±10 %	
Rated operating current I_e	max. 1 A	
No-load supply current I_0 max.	100 mA	
Max. current load per output	50 mA	
Short-circuit protected	Yes	Yes
Remote output voltage		24 V DC ±5 %
Power supply, continuous output current		500 mA
Rated insulation voltage U_i	150 V DC/125 V AC	150 V DC/125 V AC
Operational readiness		100 ms
Ambient temperature range T_a	0...+55 °C	0...+55 °C
Storage temperature range	–25...+75 °C	–25...+75 °C
Displacement		±4 mm
Switching frequency f	40 Hz	40 Hz
Function/Power indicator	Yes/yes	Yes/yes
Tightening torque	70 Nm	70 Nm
Degree of protection per IEC 60529	IP 67	IP 67
Housing material	CuZn coated	CuZn coated
Material of sensing face	PC	PC
Connection	M12 connector, male 12-pin	M12 connector, female 12-pin

Benefit from the IO-Link interface, which allows up to 16 sensors per system and lets you connect to the bus environment

***IO-Link**	
Transfer rate	
Cycle time min.	
Process data cycle	
Frame type	

Non-contact Connectors
8 Input and IO-Link

	IO-Link interface 16 IN		IO-Link interface 4× analog	
	M30×1.5	**M30×1.5**	**M30×1.5**	**M30×1.5**
	0...5 mm	**0...5 mm**	**0...5 mm**	**0...5 mm**
	Non-flush	Non-flush	Non-flush	Non-flush
	BIC000C	**BIC000E**	**BIC0053**	**BIC0054**
	BIC 1I0-I2A50-M30MI3-SM4A4A	BIC 2I0-I2A50-M30MI3-SM4A5A	BIC 1I0-IAA50-M30MI3-SM4A4A	BIC 2I0-IAA50-M30MI3-SM4A5A
	24 V DC ±10 %		24 V DC ±10 %	
	max. 1 A		max. 1 A	
	Yes	Yes	Yes	Yes
		24 V DC ±5 %		24 V DC ±5 %
	150 V DC/125 V AC	150 V DC/125 V AC	150 V DC/125 V AC	150 V DC/125 V AC
	0...+55 °C	0...+55 °C	0...+55 °C	0...+55 °C
	–25...+75 °C	–25...+75 °C	–25...+75 °C	–25...+75 °C
		±4 mm		±4 mm
	IO-Link*	IO-Link*	IO-Link*	IO-Link*
	Yes/yes	Yes/yes	Yes/yes	Yes/yes
	70 Nm	70 Nm	70 Nm	70 Nm
	IP 67	IP 67	IP 67	IP 67
	CuZn coated	CuZn coated	CuZn coated	CuZn coated
	PC	PC	PC	PC
	M12 connector, male 4-pin	M12 connector, female 5-pin	M12 connector, male 4-pin	M12 connector, female 5-pin
		Together with sensor hub		**Together with analog hub**
	38.4 kbaud		38.4 kbaud	
	3 ms		3 ms	
	12 ms		33 ms	
	1		1	

HEARTBEAT

Load level
Reversible in short term

Load level indicates the current load on the device. The display indicates the load without delay.

Stress level
Reversible in medium term

Stress level indicates the physical and thermal loads. A change in the load status delays the "pulse" of the device slightly.

Lifetime
Irreversible in long term

Lifetime indicates the remaining useful life of the device and is based on the combination of all loads.

All indicators multi-colored in green, yellow or red and show the status of the device.

IP67 Power Supplies

Reliable power for demanding industrial automation

Degree of protection per IEC 60529		**IP 67**	
Output current		3.8 A	8 A
Output power		100 W	200 W
Output voltage		24 V DC (SELV)	24 V DC (SELV)
Input voltage		100...240 V AC Single phase	100...240 V AC Single phase
Isolated output	**Ordering code**	**BAE00EN**	
(4-pin), ODVA	Part number	BAE PS-XA-1W-24-038-601	
Isolated output	**Ordering code**	**BAE00EP**	**BAE00ET**
(4-pin), SELV	Part number	BAE PS-XA-1W-24-038-602	BAE PS-XA-1W-24-080-604
Isolated output	**Ordering code**	**BAE00ER**	**BAE00FL***
(5-pin) SELV	Part number	BAE PS-XA-1W-24-038-603	BAE PS-XA-1W-24-080-605
Efficiency		High efficiency > 93 %	
MTBF		> 800,000 h	
Input		3-pin (male)	
Output		4-pin (female), 2 circuits Optional: 2 connectors for output voltage, each with 2 circuits 5-pin (female) for DN Network Power	
Operating temperature		–25...+70 °C	
Storage temperature range		–40...+80 °C	
Mounting		Panel, wall and field mounting	
Housing material		Metal, fully enclosed	
Service life		Almost 15 years	
Warranty		2 years	

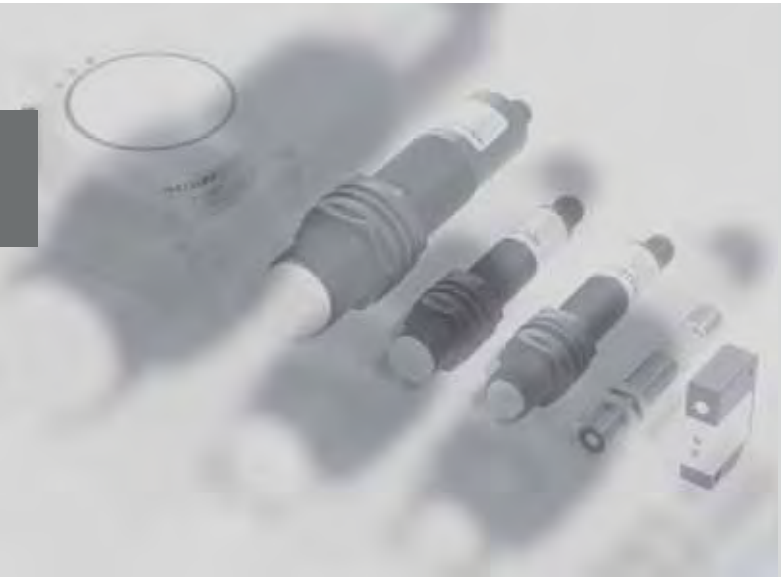
*contact factory for availability

mechanical accessories

protection cap
mounting system
clamp holders
cushion mounts
tube switch

- Suitable for ultrasonic sensors M18 series
- Protects the sensing surface from mechanical load and hot weld splatter
- With a special coating and grid technology, the cooled splatter does not reach the sensing surface and drops out through an outlet

Ultrasonic sensors in welding lines
In a welding line, ultrasonic sensors BUS detect workpieces in the various steps and positions. With the use of a protection cap, the ultrasonic converter is protected from hot weld splatter.



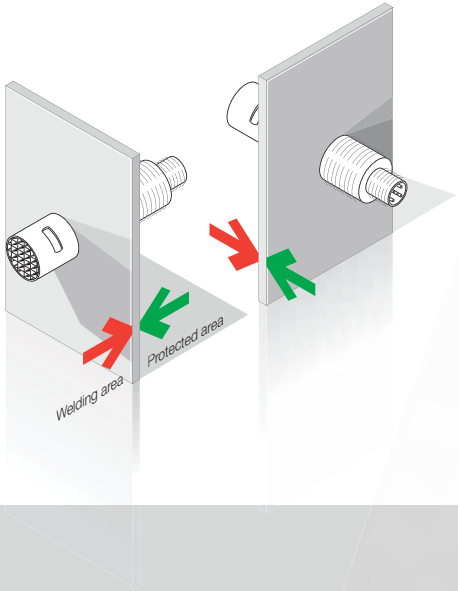
Whether position detection, distance measurement or the detection of solid, powder or liquid media independent of color, transparency and surface finish: ultrasonic sensors are precision solutions. Particularly when large operating ranges and high accuracies are called for, the BUS ultrasonic sensors show what they're capable of. In dusty, humid and misty working conditions, they are often the only alternative.

- Very large operating range
- For difficult environmental conditions
- Insensitive to dirt
- Object-independent distance measurement
- High resolution
- Reliable detection of the smallest objects
- Detection of sound-absorbing materials

For additional information, see our catalog or visit our website at **www.balluff.com**

Balluff Protection Cap
For ultrasonic sensors in harsh ambient conditions

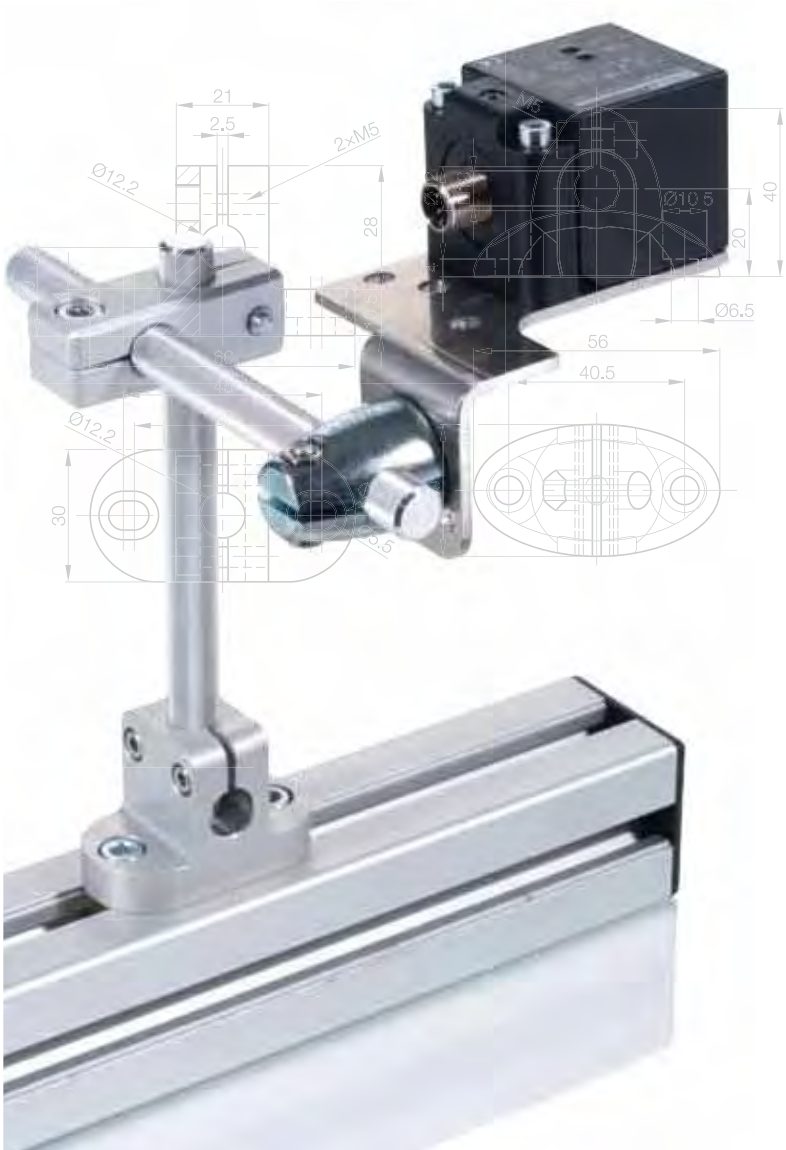
Installation note
The sensor is pushed through a bore hole and secured in the protected area using a locknut. With this type of installation, only the protection cap is exposed to the harsh ambient conditions.



Size	**M18×1**
Version	Welding protection for M18 ultrasonic sensors BUS
Ordering code	**BAM01LJ**
Part number	BAM PC-US-007-M18-2/W
Housing material	CuBe 2-coated

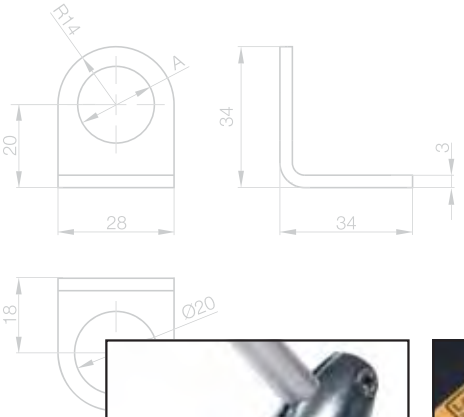
Usable for ultrasonic sensors BUS M18 with a range of up to 600 mm.

- For all areas in the automation industry
- Modular structure
- Compact and flexible



BMS Mounting System
Designed for industrial automation

Sensors must be positioned inside plants, machines or conveyor systems, usually during the setup process. Modular elements from the Balluff mounting system provide valuable assistance here. The flexible Balluff mounting system can be mounted on base plates and all standard profiles. Almost every corner of the working area can be covered using the versatile range of accessories.



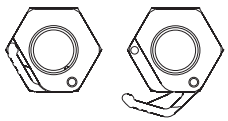
17× Standard
3× Stainless steel
10× PTFE-coated, weld-immune

12× Standard with latch
6× Standard with latch
PTFE-coated, weld-immune
6× Stainless steel with latch
6× Stainless steel with latch
PTFE-coated, weld-immune

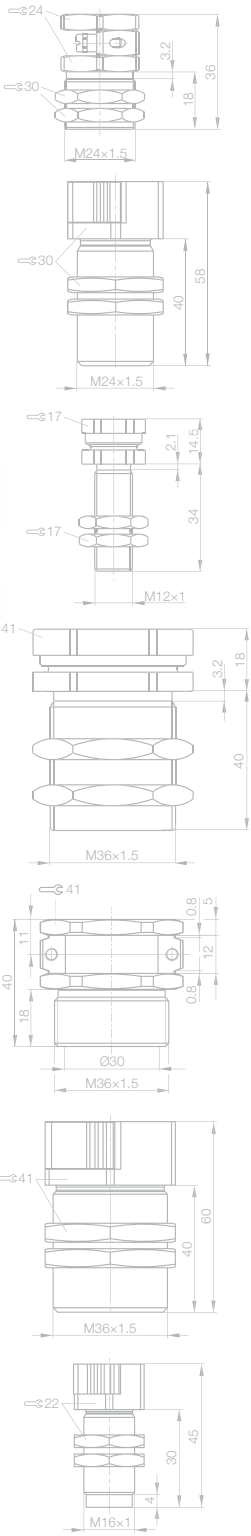
5× for installation in containers

65 clamp variants!

Balluff has revolutionized methods for attaching sensors with the new latch clamping principle. The sensor is inserted into the clamps and secured in position by folding over the latch. The latch can secure any sensor in all areas of the automation sector without the use of tools.

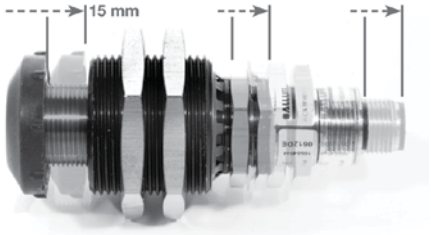


Closed Open



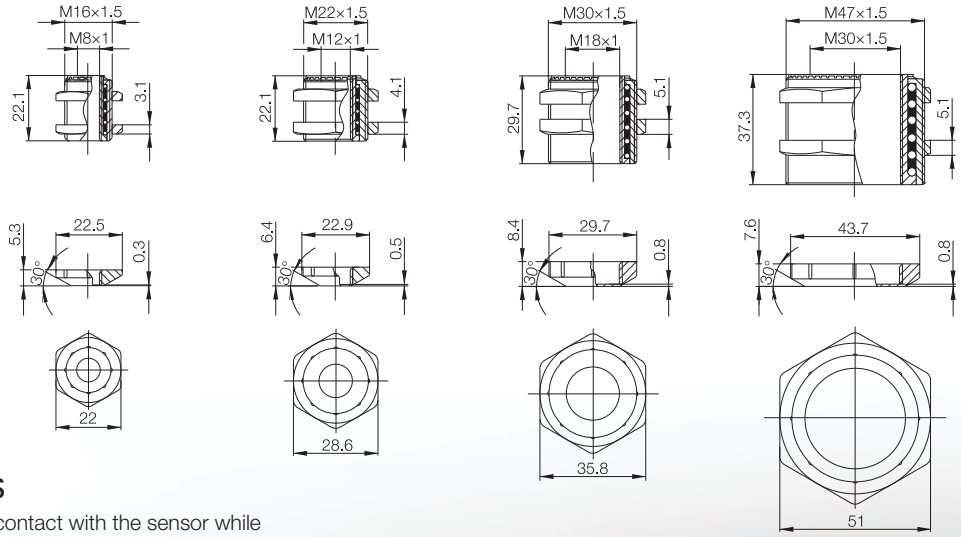
Clamp Overview
65 clamp variants

Stainless Steel



- For all areas in the automation and material handling industry
- Protects your sensors
- Increases system reliability

Description	**Cushion mounts**	**Cushion mounts**	**Cushion mounts**	**Cushion mounts**
Version	For **M8** sensors for mechanical protection	For **M12** sensors for mechanical protection	For **M18** sensors for mechanical protection	For **M30** sensors for mechanical protection
Ordering code	**BAM015U**	**BAM015W**	**BAM015Y**	**BAM015Z**
Part number	BESA 08-CM	BESA 12-CM	BESA 18-CM	BESA 30-CM
WAF	22	29	35	51
Ambient temperature range	–45...+85 °C	–45...+85 °C	–45...+85 °C	–45...+85 °C
Material	Anodized Al, POM	Anodized Al, POM	Anodized Al, POM	Anodized Al, POM

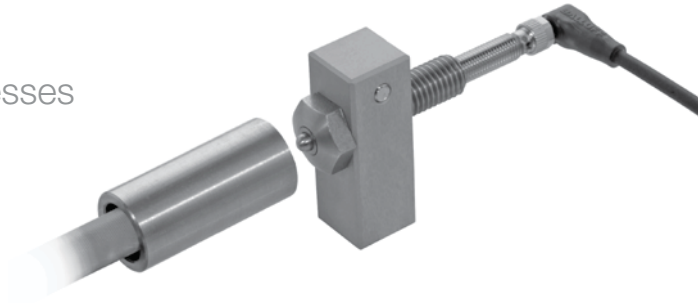


Cushion mounts

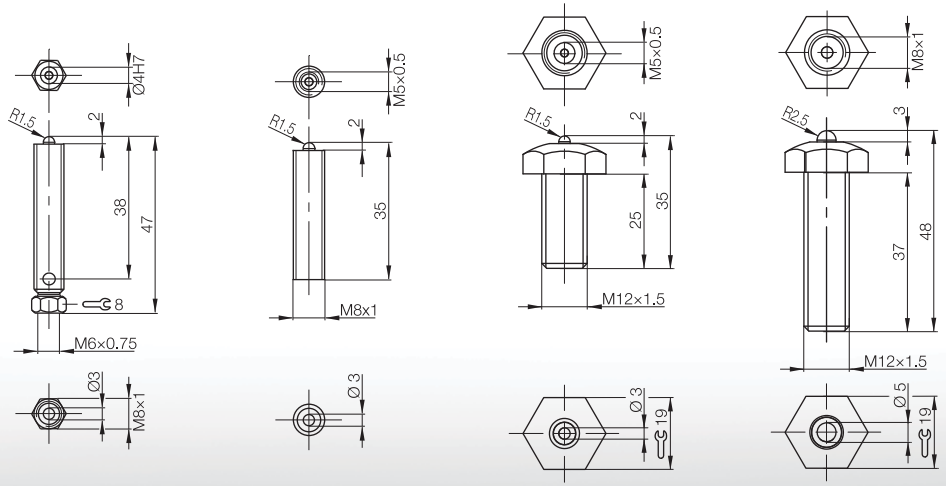
The cushion mount absorbs any contact with the sensor while preventing damage, max. stroke 15 mm. The object runs up against an attached protective cap and pushes the sensor back, preventing damage to the sensor or the coil as a result. The cushion mount reduces impact related failures and retains the sensor's mounting position.

Cushion Mounts and Tube Switch

Reliable protection for your sensors and processes

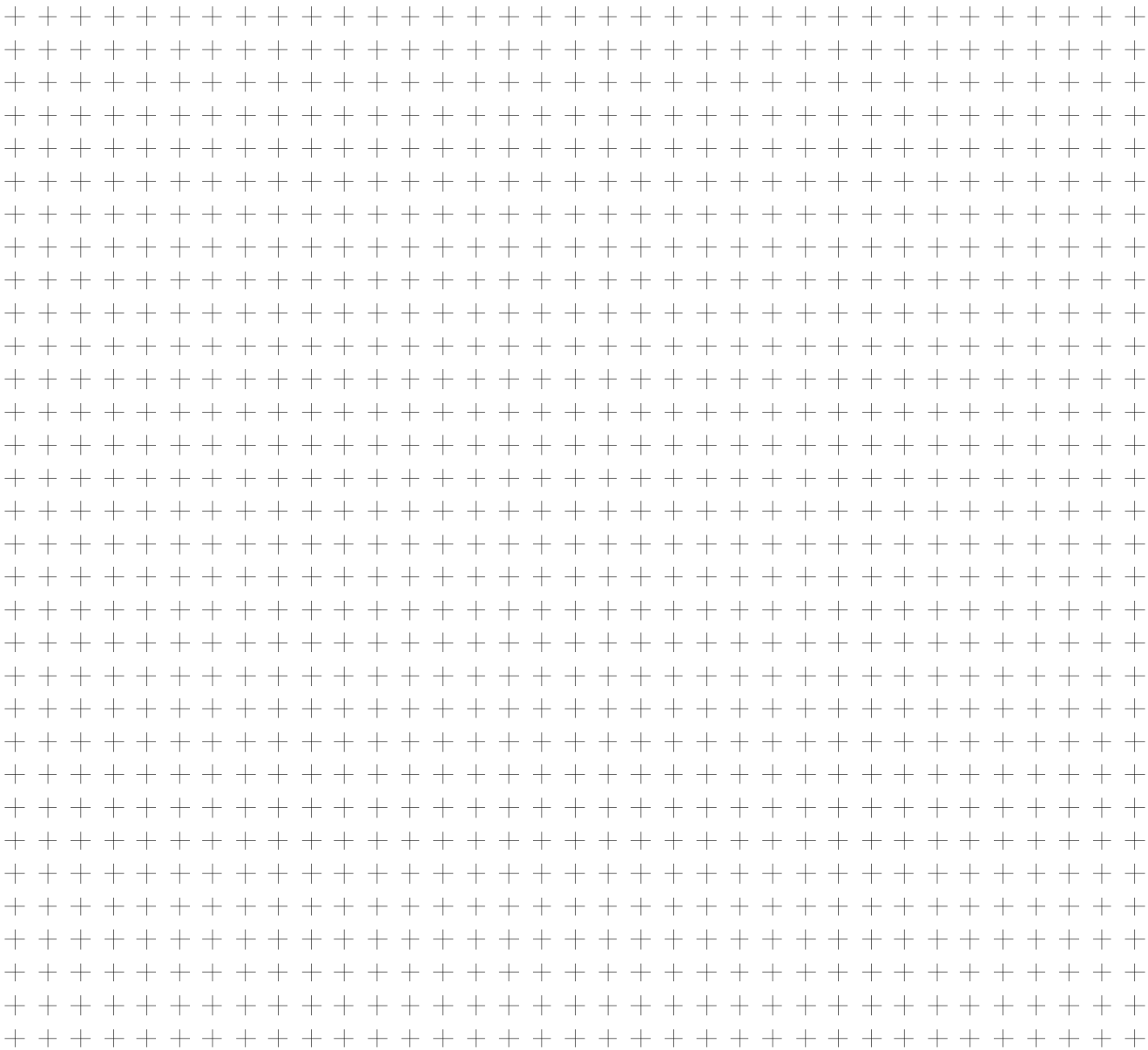


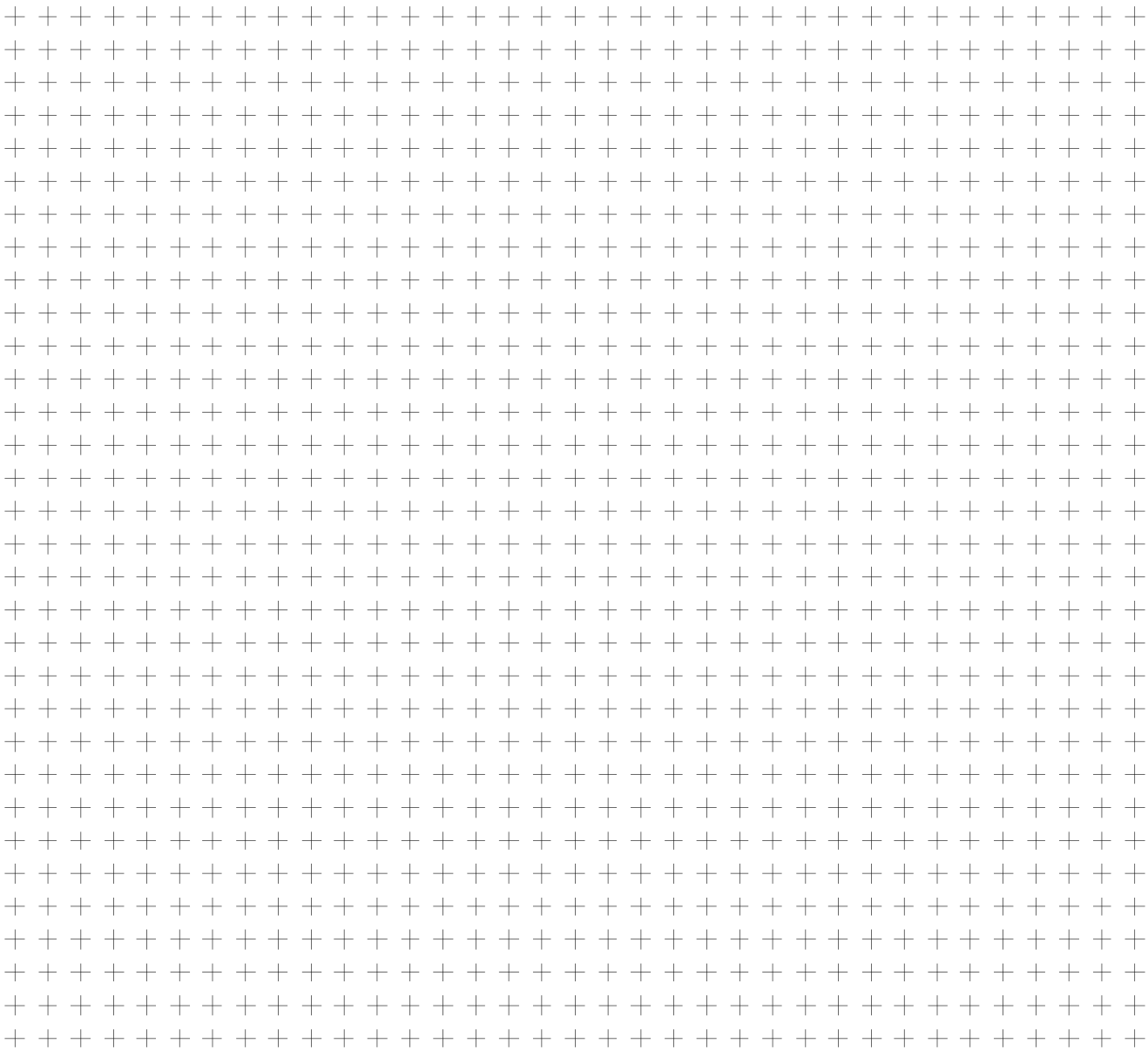
Description	**Tube switch**	**Tube switch**	**Tube switch**	**Tube switch**
Version	For sensors **Ø 4 mm** for mechanical protection	For **M5** sensors for mechanical protection	For **M5** sensors for mechanical protection	For **M8** sensors for mechanical protection
Ordering code	**BAM01C0**	**BAM01AZ**	**BAM019Y**	**BAM019W**
Part number	BAM FS-XE-002-D4-4	BAM FS-XE-001-M5-4	BAM FS-XE-003-M5-4	BAM FS-XE-004-M8-4
Spring force F (N)	3	3	3	4
Impact force $F_{max.}$ (N)	400	400	400	400
Switching operations min. (with $F_{max.}$)	500000	500000	500000	500000
Housing material	Stainless steel	Stainless steel	Stainless steel	Stainless steel

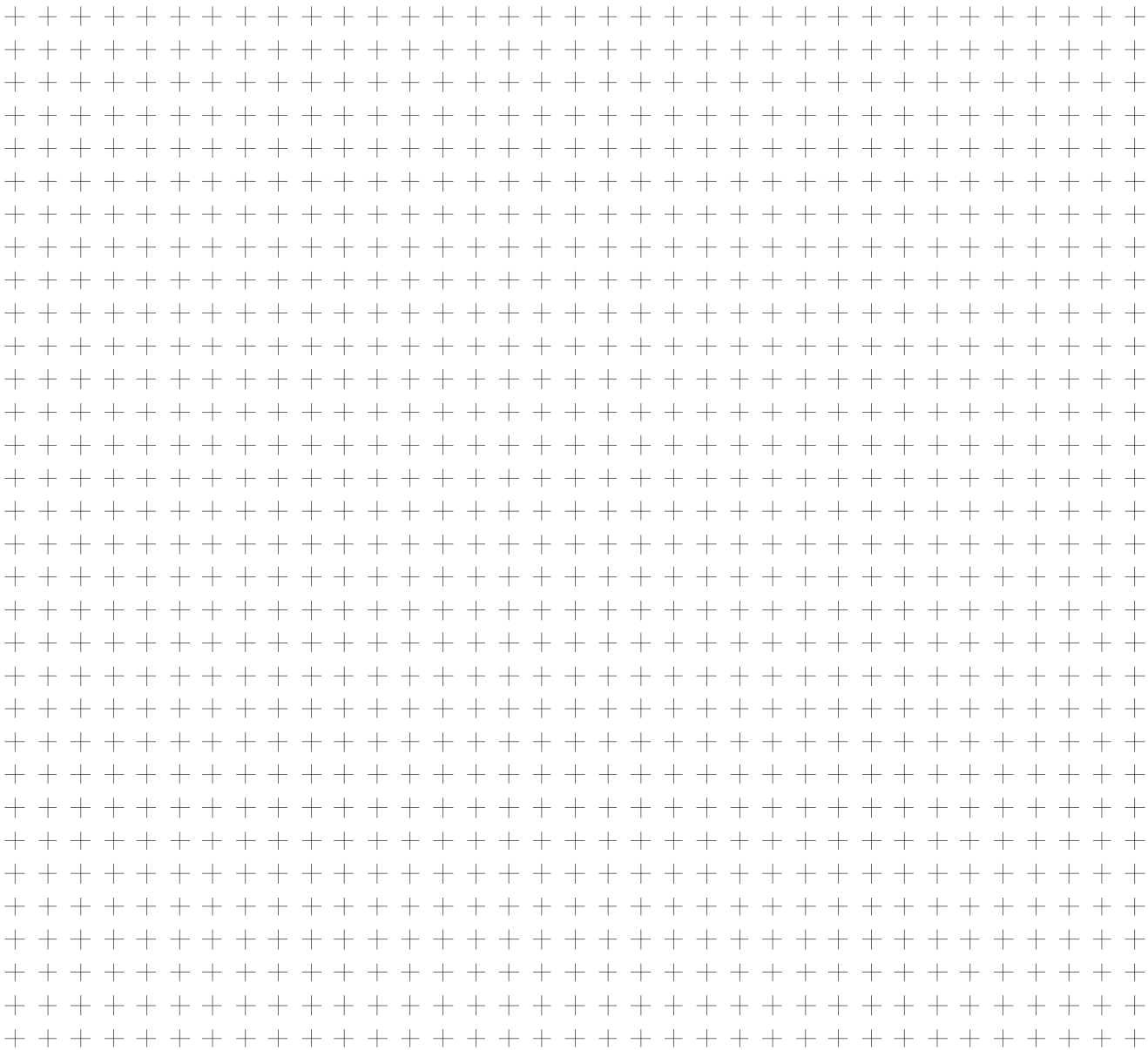


Tube switch

The tube switch combines the advantages offered by mechanical position switches and inductive sensors. Manufactured from stainless steel, it is extremely robust, very reliable even under difficult conditions and can be used immediately in any application in combination with the relevant inductive sensor.







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Sensor solutions for automation

FULL RANGE

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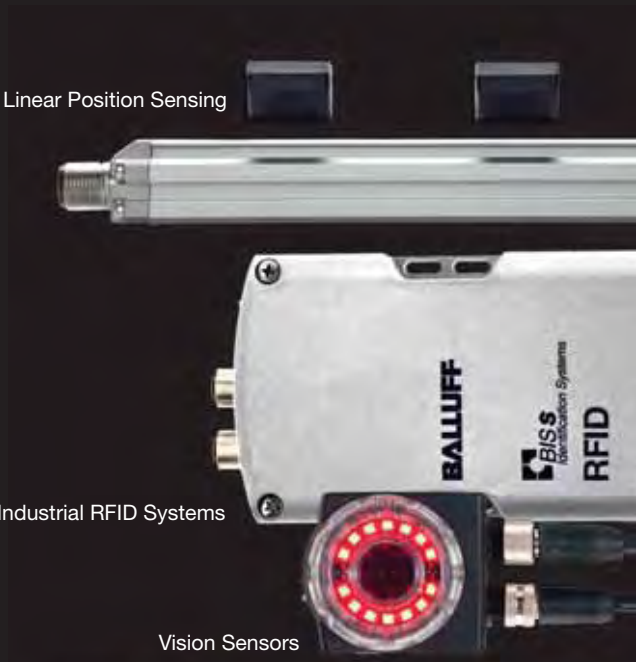
Object Detection

Linear Position Sensing



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Object Detection

Inductive sensors BES, cylinder sensors BMF, magnetic field sensors BMF, capacitive sensors BCS for object detection, ultrasonic sensors BUS for object detection, photoelectric sensors BOS, fiber optic devices BFB, fiber optics BFO, angle sensors BWL, through-beam fork sensors BGL, optical window sensors BOW, light grids BLG, contrast sensors BKT, luminescence sensors BLT, color sensors BFS, mechanical and inductive single and multiple position switches BNS

Linear Position Sensing

Micropulse® transducers BTL, magnetic linear encoder system BML, inductive displacement system BIW, inductive distance sensors BAW, magnetoinductive distance sensors BIL, capacitive distance sensors BCW, photoelectric distance sensors BOD, ultrasonic sensors BUS for analog distance measurement

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Industrial RFID

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